"Express Mail" mailing label number
EL 746 761 271 US

Date of Deposit August 2, 2001.

JC20 Rec'd PCT/PTO 02 AUG 2001

FORM PTO-1390 (REV. 5-93)	U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371	CASE NO. 9683/91 U.S. APPLICATION NO. (If known, see 37 C F R 1 5) 09/890910
INTERNATIONAL APPLICATION NO. PCT/JP00/08654	INTERNATIONAL FILING DATE December 7, 2000	PRIORITY DATE CLAIMED December 10, 1999

TITLE OF INVENTION
MOBILE COMMUNICATION TERMINAL AND CARD INFORMATION READING DEVICE

APPLICANT(S) FOR DO/EO/US
Takeshi Natsuno

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a FIRST submission of items concerning a filing under 35 U.S.C. 371
2. ☐ This is a SECOND or SUBSEQUENT submission of items concerning a filing under 35 U.S.C. 371
3. ☒ This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. ☐ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2)).
   a. ☒ is transmitted herewith (required only if not transmitted by the International Bureau).
   b. ☐ has been transmitted by the International Bureau.
   c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US)
6. ☒ A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3)).
   a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau)
   b. ☐ have been transmitted by the International Bureau.
   c. ☐ have not been made; however, the time limit for making such amendments has NOT expired
   d ☒ have not been made and will not be made.
8. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)) and/or amendments under Article 34.

Items 11. to 16. Below concern other document(s) or information included:

11. ☒ An Information Disclosure Statement (in duplicate) under 37 CFR 1.97 and 1.98.
12. ☒ An assignment document for recording. A separate cover sheet (in duplicate) in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☐ A FIRST preliminary amendment.
    ☐ A SECOND or SUBSEQUENT preliminary amendment.
14. ☐ A substitute specification.
15. ☒ A change of power of attorney and/or address letter.
16. ☒ Other items or information: Copy of Request (Form PCT/RO/101), Copy of Form PCT/IB/301, Copy of Form PCT/IB/308; Copy of International Search Report, Copy of Int'l Publication No. WO 01/43404 A1, Form PTO-1449, Thirteen (13) Cited References (A1-A13), Six (6) English Translations (References A7-A9, A11-A13), and Return Postcard.

JC03 Rec'd PCT/PTC 02 AUG 2001

U.S. APPLICATION NO. (If known, see 37 C.F.R. 1.50) 09/890910	INTERNATIONAL APPLICATION NO. PCT/JP00/08654	CASE NO. 9683/91

17. ☒ The following fees are submitted:

Basic National Fee (37 CFR 1.492(a)(1)-(5)):

	CALCULATIONS	PTO USE ONLY
Search Report has been prepared by the EPO or JPO $860.00		
International preliminary **examination** fee paid to USPTO (37 CFR 1.492(a)(1)) $690.00		
No international preliminary examination fee paid to USPTO (37 CFR 1.482) but international **search** fee paid to USPTO (37 CFR 1.492(a)(2)) $710.00		
Neither international preliminary **examination** fee (37 CFR 1.482) nor international search fee (37 CFR 1.492(a)(3)) paid to USPTO $1,000.00		
International preliminary examination **fee** paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(1)-(4) $100.00		
ENTER APPROPRIATE BASIC FEE AMOUNT	$1000	
Surcharge of $130.00 for furnishing the oath or declaration later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492(e)).		

Claims	Number Filed	Number Extra	Rate		
Total Claims	14- 20 =	0	x $ 18.00		
Independent Claims	2- 3 =	0	x $ 80.00		
Multiple dependent claim(s) if Applicable)		0	+ $270.00		

	CALCULATIONS	PTO USE ONLY
TOTAL OF ABOVE CALCUATIONS =	$1000	
Reduction by ½ for filing by small entity, if applicable. Verified Small Entity statement must also be filed. (Note 37 CFR 1.9, 1.27, 1.28)		
SUBTOTAL =	$1000	
Surcharge of $130.00 for furnishing the English translation later than the ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1 492(f)).	$	
TOTAL NATIONAL FEE=	$1000	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31), $40.00 per property +	40.00	
TOTAL FEES ENCLOSED=	$1040	
	Amount to be refunded	$
	charged	$

a. ☒ Two checks in the amounts of $1000 and $40 to cover the above fees are enclosed.

b. ☐ Please charge my Deposit Account No. 23-1925 in the amount of $ to cover the above fees. A duplicate copy of this sheet is enclosed.

c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 23-1925. A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

Send All Correspondence to:

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Registration Number 48,059

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DESCRIPTION

Mobile Communication Terminal and Card Information Reading Device

TECHNICAL FIELD

This invention relates to a mobile communication terminal for storing a plurality of card information items; and a card information reading device for reading the card information from the mobile communication terminal.

BACKGROUND ART

So far, credit transactions using credit cards and bank transactions using bank cards have been widely taking place. Recently, a new service has also began for settling payment using debit cards.

However, having a plurality of credit card contracts and a plurality of bank accounts requires carrying a credit card or bank card for respective contracts or accounts, which has been a problem of being troublesome for card users.

DISCLOSURE OF THE INVENTION

The present invention is made in consideration with the above-mentioned situation and has an object of providing a mobile communication terminal and card information reading device for relieving card users from carrying various cards such as credit cards and bank cards.

In order to achieve the above object, the present invention provides a mobile communication terminal, served in the mobile communication network for performing wireless communications, comprising a memory for storing card information items for a plurality of cards and an output interface for selecting and reading out one of said card information items from said memory to output the selected card information item; and a card information reading device comprising a reading device capable of reading codes displayed on a display device of said mobile communication terminal and an analyzing device for analyzing said read codes.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a block diagram showing a configuration of a mobile station 100 used for a first embodiment of the present invention.

Fig. 2 is a perspective view of the mobile station 100 with a magnetic card 161 retracted.

Fig. 3 is a perspective view of the mobile station 100 with the magnetic stripe 160 portion of the magnetic card 161 protruded.

Fig. 4 is block diagram showing a configuration of a credit transaction system using the mobile station 100.

Fig. 5 is a diagram showing a configuration of a subscriber database 331.

Fig. 6 is a data format diagram of a registered subscriber information file 304.

Fig. 7 is a diagram showing a configuration of a member database 61.

Fig. 8 is a diagram showing a configuration of a credit database 62.

Fig. 9 is a diagram showing a configuration of a prospective contract-renewal members file 601.

Fig. 10 is a block diagram showing a configuration of a gateway server 32.

Fig. 11A and Fig. 11B cooperate to form a flow diagram of the first half sequence of a flow diagram of operations for signing up credit card contracts, shopping with a credit card via a mobile packet communication network, making changes in registered member information, canceling credit card contracts, and inquiring for credit histories.

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Fig. 12A and Fig. 12B cooperate to form a flow diagram showing an operation of the mobile station 100 and the credit transaction system in signing up credit card contracts.

Fig. 13A to Fig. 13J are diagrams showing screen images displayed on a liquid crystal display 132 of the mobile station 100 in signing up a credit card contract.

Fig. 14A and Fig. 14B cooperate to form a flow diagram showing an operation of the mobile station 100 and the credit transaction system in shopping with a credit card function of the mobile station 100 in the shop.

Fig. 15A and Fig. 15B cooperate to form a flow diagram showing an operation of the mobile station 100 and the credit transaction system in shopping with a credit card function of the mobile station 100 via the mobile packet communication network.

Fig. 16A and Fig. 16B cooperate to form a flow diagram showing an operation of the mobile station 100 and the credit transaction system in renewing credit card contracts.

Fig. 17A and Fig. 17B cooperate to form a flow diagram showing an operation of the mobile station 100 and credit transaction system in making changes in registered member information.

Fig. 18 is a flow diagram showing an operation of the mobile station 100 and the credit transaction system in canceling credit card contracts.

Fig. 19 is a flow diagram showing a flow of an operation in disabling calling and credit card functions of the mobile station 100.

Fig. 20 is a flow diagram showing a flow of an operation in inquiring for credit histories.

Fig. 21 is a block diagram showing a configuration of a mobile station 100 that displays bar codes indicating credit card contract information on its liquid crystal display 132.

Fig. 22 is a block diagram showing a configuration of CAT 40 equipped with a bar-code reader.

Fig. 23 is a block diagram showing a configuration of the mobile station 100 that transmits credit card contract information to the CAT 40a, 40b,... by an infrared communication.

Fig. 24 is a block diagram showing a configuration of a CAT 40 equipped with an infrared receiver and a demodulator.

Fig. 25 is a block diagram showing a configuration of a mobile station 100 that transmits credit card contract information to the CAT 40a, 40b,... by an existing data input/output terminal.

Fig. 26 is a block diagram showing a configuration of a CAT 40 equipped with an input/output terminal.

BEST MODE OF CARRYING OUT THE INVENTION

[1] First Embodiment

[1. Configuration of the Embodiment]

[1-1. Configuration of Mobile Station]

Fig. 1 is a block diagram showing a configuration of a mobile station 100, a mobile communication terminal used in a first embodiment of the present invention. As shown in the figure, the mobile station 100 has a transmitter-receiver 110, a control unit 120, a user interface 130, a data input/output terminal 140, a magnetic writer 150, and a magnetic stripe 160.

Fig. 2 and Fig. 3 are perspective views showing the appearance of the mobile station 100. This mobile station 100 is equipped with a magnetic card 161 that has a card-type magnetic recording medium, a magnetic stripe 160 shown in Fig. 1 in the concrete, a card retracting/protruding key 131, and a slot 101 for retracting or protruding the magnetic card 161. The user operates the card retracting/protruding key 131, thereby permitting the magnetic card 161 retracted in the slot 101 as shown in the Fig. 2, or the magnetic stripe 160 portion of the magnetic card 161 protruded out of the slot 101.

In Fig. 1, the transmitter-receiver 110 handles wireless communications with base stations of a mobile communication network which provides the mobile telephone communication service and the mobile packet communication service.

The control unit 120 controls each of the sections of the mobile station 100, and comprises a CPU 121, a program ROM 122, a credit card contract ROM 123, and a RAM 124. The operational modes in this mobile station 100 include a calling mode for performing phone-to-phone conversations via the mobile communication network, and a packet communication mode for performing packet communications via the mobile packet communication network. Users can set a desired mode. The control unit 120 controls each of the sections of the mobile station 100 according to set state of each of these modes.

The RAM 124 is used as a work area for the CPU 121 or a user data area for storing such information as phone directory data.

The credit card contract ROM 123 is a memory for storing card information. In the present embodiment, credit card contract information on profiles of a credit card contract under which a user of the mobile station 100 is with a credit card company are stored as card information. These credit card contract information are card information given from the credit card company to its members, the information including, for example, the name of the credit card company with which a user is under contract, a URL of the server of the credit card company (as will hereinafter be described), the expiration date of the credit card, and also information for identifying a user such as a credit-card number (an identification number given to each credit card usually consisting of 16-digit numerals) and the member's name. In a case where a user of the mobile station 100 is under contract with a plurality of credit card companies, the credit card contract information corresponding to the plurality of credit cards are stored in this credit card contract ROM 123.

This credit card contract ROM 123 is accessible only from a special ROM reader/writer or a private server owned by a credit card company. In the case of being accessed from a special ROM reader/writer to the credit card contract ROM 123, write information to the credit card contract ROM 123 are transmitted to the control unit 120 from the ROM reader/writer connected to the data

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input/output terminal 140. The control unit 120, after ensuring the validity of the accessing ROM reader/writer, writes the write information into the credit card contract ROM 123. Also, in the case of being accessed from a private server to the credit card contract ROM 123, write information to the credit card contract ROM 123 are transmitted to the control unit 120 from the server via a network such as the mobile packet communication network. The control unit 120, after ensuring the validity of the accessing server, writes the write information into the credit card contract ROM 123. The control unit 120, when it detects any means other than the above that tries to access the credit card contract ROM 123, carries out the disabling operation of the mobile station 100 itself.

The program ROM 122 stores control programs. The CPU 121 reads out these programs and carries out various types of control processes. These control programs include various programs described below as well as programs for the calling function usually stored in a mobile station of the existing mobile communication system.

These control programs include a document data viewing software, known as a browser. The CPU 121 reads out the browser from the program ROM 122 to carry it out, which permits the acquiring of data in the HTML form from various information providing servers connected to the internet via, for example, a gateway server 32 shown in the Fig. 4. This gateway server 32 is a computer system established at a mobile packet gateway relaying/switching center for interconnecting the mobile packet communication network 30 and other networks such as the Internet 70. The gateway server 32

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performs protocol conversion for performing communications among a plurality of networks, each of which uses a different protocol. The acquiring of HTML data by the mobile station 100 is performed by transmitting an acquisition request specifying the URL of a resource to a server providing information via this gateway server 32 and completed by storing in the RAM 124 the HTML data transmitted, in response to the request, from the server providing the information.

In addition, these control programs include a program for storing credit card contract information in the credit card contract ROM 123. This program also reads out, makes changes, or deletes the credit card contract information stored in the credit card contract ROM 123.

The control programs further include a program for controlling the magnetic writer 150 that functions as an output interface for outputting card information, thereby writing in or deleting from the magnetic stripe 160 the credit card contract information read out from the credit card contract ROM 123; and a program to transmit to a merchant's server 80C, 80D, as will hereinafter be described, the credit card contract information that have been read out from the credit card contract ROM 123.

The control programs also include a program for, when the mobile station 100 is turned on, transmitting information that includes information to the effect that the power is on and an identification number for the mobile station 100 via a particular channel.

Also, as mentioned earlier, the control programs include a program, when it detects any attempt to access the credit card

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contract ROM 123 by an unjustified means, for disabling the mobile station 100 itself.

The magnetic writer 150 writes credit card contract information given from the control unit 120 into the magnetic stripe 160, or deletes credit card contract information from the magnetic stripe 160.

The magnetic stripe 160 is similar to magnetic stripes widely used for existing credit cards. Therefore, credit card contract information written in the magnetic stripe 160 is readable by a currently widely-used credit authentication terminal (CAT) for reading magnetic stripes.

This magnetic stripe 160 is provided on a card made of plastic that is retractable in the mobile station 100, the magnetic card 161 in Fig. 3. This magnetic card 161 is retracted or protruded by the card retracting/protruding key 131 established on the keypad of the mobile station 100, or by a specified key operation using an existing keyboard (refer to Fig. 2 and Fig. 3). The magnetic card 161 is usually retracted inside the mobile station 100, but when doing shopping, the portion of the magnetic stripe 160 is protruded outside the mobile station 100. The back side of this magnetic card 161 has a section for a user's signature in the same way as existing credit cards.

The user interface 130 includes a liquid crystal display 132, a keypad by which users perform various input operations, and a microphone and a speaker for users to hold conversations.

[1-2. Configuration of Credit Transaction System]

Fig. 4 is a block diagram showing a configuration of the credit transaction system using a mobile station 100. This credit transaction system comprises the mobile station 100, a mobile telephone network 20, and a mobile packet communication network 30, CATs 40a, 40b, ... , the Credit and Finance Information System (CAFIS) network 50, credit card company's servers 60A, 60B, ... , the Internet 70, and merchant's servers 80C, 80D, ...

A user registered as credit card members carry the mobile station 100. The mobile station 100 is capable of connecting to the mobile telephone network 20 and the mobile packet communication network 30.

The mobile telephone network 20 provides general calling services using mobile stations, and the mobile station 100 receives the services over this mobile telephone network 20. This mobile telephone network 20 comprises many base stations 31 spaced out at a certain interval within communication areas, a switching unit for performing circuit-switching (not shown), a control unit 33 for controlling the inside of the network, and communication cables (not shown).

This control unit 33 is equipped with a subscribers database 331 that stores a variety of information relating to subscribers who use the communication services. The above-mentioned base stations 31, the switching unit, the control unit 33, and communication cables are shared by the mobile packet communication network 30.

Fig. 5 is a diagram showing a data format of the subscriber database 331. As shown in the figure, the subscriber database 331 stores various types of information for each subscriber of the mobile telephone network 20, that is, for each user of the mobile station 100, the information including the phone number of the mobile station 100 owned by the subscriber, his/her name, sex, date of birth as well as disabling information that orders the disabling the mobile station 100 and its credit card function. A disablement flag is registered in a disabling information cell for a user with the mobile station 100 and its credit card function are disabled.

As shown in the Fig. 4, the mobile packet communication network 30 includes a gateway server 32 in addition to the above-mentioned base station 31, switching unit (not shown), control unit 33, and communication cables.

The gateway server 32 performs the inter-conversion of a transmission protocol for the mobile packet communication network 30 and the TCP/IP, a standard communication protocol of the Internet 70. In addition, the gateway server 32 controls various types of message delivery processings performed among the mobile station 100, the credit card company's server 60A, 60B, ..., and the merchant's server 80C, 80D, ...

Fig.10 is a block diagram showing a configuration of the gateway server 32. This gateway server 32 has a control unit 301, a subscriber information manager 302, and a data delivery manager 303.

The control unit 301 controls each of the sections of the gateway server 32 and also functions as an interface among protocols such as to perform protocol conversion between the mobile packet communication network 30 and another network such as the Internet 70.

The control unit 301 stores encryption algorithm such as Secure Sockets Layer (SSL). Performing communication with the

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credit card company's server 60A, 60B, ... and the merchant's server 80C, 80D, ... using this encryption algorithm protects the communication.

The subscriber information manager 302 stores and manages a registered subscriber information file 304 that can be obtained referring to the subscriber database 331 of the control unit 33. Fig.6 is a diagram showing a data format of the registered subscriber information file 304. As shown in the figure, for each subscriber of the mobile packet communication network 30, that is, for each user of the mobile station 100, the registered subscriber information file 304 stores a variety of data such as the phone number of the mobile station 100 owned by the subscriber, his/her name, sex, date of birth, the storage location of data and electronic-mail messages delivered to the user in the data delivery manager 303, and a password pre-registered by the user.

The control unit 301 performs user authentication of a user of the mobile station 100 that has accessed to the gateway server 32 in order to use the specified service. The control unit 301 of the gateway server 32 handles this user authentication by matching a password entered by the user on the mobile station 100 and the password within the registered subscriber information file 304.

The data delivery manager 303 relays the delivering of electronic-mail messages and various data among users of two or more mobile station 100; between a user of the mobile station 100 and a user of another network such as the Internet 70; between a user of the mobile station 100 and a credit card company's server 60A, 60B, ...; and between a user of the mobile station 100 and a merchant's server 80C, 80D, ...

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To illustrate, the data delivery manager 303 receives a communication request including the destination and the content of a communication from a mobile station 100 or a credit card company's server 60A, 60B, ..., and transmits the contents to the destination. Alternatively, the data delivery manager 303, after receiving the communication request, once stores the received contents, and makes a notification to the effect that the contents have been stored, to the terminal of the requested destination (for example, the mobile station 100). Subsequently, upon receiving the request for obtaining the contents, the data delivery manager 303 transmits the stored contents to the terminal. For this purpose, the data delivery manager 303 has a memory (not shown) inside for storing the communication contents temporarily.

This memory stores a variety of service information to be transmitted to the mobile station 100 and displayed as a menu on the liquid crystal display 132 of the mobile station 100. The service information are data in the HTML format, data for each service item including the URL of a server which carries out each service.

This memory also stores information on merchants where credit card purchases can be made over the mobile packet communication network 30. The merchants information are also data in the HTML format, and data for each merchant includes the URL of the server of each merchant. This merchants information are transmitted to the mobile station 100 and displayed on the liquid crystal display 132 of the mobile station 100.

When a user requests a particular service using the mobile station 100, the mobile station 100 transmits a URL that is included

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in data for the service item to the gateway server 32, and the gateway server 32, based on the URL received, makes an access to the server which implements the service. When a user makes a purchase with a credit card at a certain merchant via the mobile packet communication network 30, a URL written in the HTML data format is used as well.

A number of CATs 40a, 40b, ... shown in Fig. 4 are established at merchants and cash dispenser(CD)s. The CATs 40a, 40b, ... are equipped with a magnetic reader (not shown) and capable of reading the credit card information recorded on the magnetic stripe 160 of the mobile station 100. The CATs 40a, 40b, ... are also equipped with an input interface (not shown), and through this input interface salespersons in the shop can enter a certain information item such as the amount of purchase. The CATs 40a, 40b, ... are connected to a private network, the CAFIS network 50, to which the credit card contract information read from the magnetic stripe 160 and information such as the amount of transaction, transaction date, and merchant with regard to the credit card purchase are transmitted. These information given from the CATs 40a, 40b, ... to the CAFIS network 50 will be referred to as credit information hereinafter.

The CAFIS network 50 is formed by connecting a number of CATs 40a, 40b, ... and credit card company's servers 60A, 60B, ... This CAFIS network 50 is a nationwide network that connects credit card companies, distribution companies, and financial institutions, the CAFIS control center (not shown) centralizing the network.

This CAFIS network 50 transmits various credit information that result from such actions as shopping and cash advance with credit card by a user, to one of the credit card company's servers

60A, 60B, ... which provides a contract. It also transmits information on approval or denial of the credit card use from the one of the credit card company's servers 60A, 60B, ... to one of the CATs 40a, 40b, ...

The server 60A, 60B, ... is established at each credit card company, and connected to the CAFIS network 50 and the Internet 70. This credit card company's server 60A, 60B, ... comprises a member database 61A, 61B, ... for storing such information as member profiles and credit card contract information, and a credit database 62A, 62B, ... for storing members' credit histories and payment settlement information.

Fig. 7 shows a data format of the member database 61A, 61B, ..., and Fig. 8 shows a data format of the credit database 62A, 62B, ...

As shown in Fig. 7, the member database 61A, 61B, ... stores member profiles such as each user's name, age, address, phone number, employment, and annual income, and credit card contract information relating to each credit card contract such as card number, expiration date, and credit limit. These member profiles information are reported by users at the time of signing up contracts, and changed anytime when changes are reported from the users. Further, these credit card contract information are information granted to each of the contracts by a credit card company once the credit card membership is approved, and part of the information is updated every time the expiration date comes.

In addition, as shown in Fig. 8, the credit database 62A, 62B, ... stores credit history such as transaction dates of credit purchases and cash advances, merchants, and amount of transactions, and credit settlement information such as amount paid for each billing cycle. This credit history (the transaction dates, merchants, and amount of transactions) are information transmitted from the CAT 40a, 40b, ... and the merchant's server 80C, 80D, ... to the credit card company's server 60A, 60B, ... Then, the credit card company's server 60A, 60B, ... totals amount of payment for each billing cycle based on the information on dates and amounts of transactions, and stores the totaled amount as credit settlement information.

The main functions of the credit card company's server 60A, 60B, ... are 1) the processing of credit card contracts (including admission, renewal, changes, and cancellation), 2) the determination on approval or denial of credit card contracts and purchases, 3) the accumulation of various information on credit card contracts and credit card transactions, 4) the settlement amounts on credit-card transactions, and 5) the provision of various information for members, each of which will be described below in detail.

First of all, the credit card company's server 60A, 60B, ... pre-stores an entry screen to be transmitted to the mobile station 100 for signing up a credit card contract and a change screen to be transmitted to the mobile station 100 for making changes in contracts; upon receiving a credit card contract request, an entry screen corresponding to the request is provided to the mobile station 100 through the Internet 70 and the gateway server 32.

Furthermore, the credit card company's server 60A, 60B, ... creates and stores a prospective contract-renewal members file 601A, 601B, ... This prospective contract-renewal members file 601A, 601B, ... stores information on members whose contract renewal is

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approaching.

Fig. 9 shows a data format for the prospective contract-renewal members file 601A, 601B, ... As shown in this figure, the prospective contract-renewal members file 601A, 601B, ... stores data such as each member's name, credit number, phone number, and date of expiration. The credit company's server 60A, 60B, ... refers to the expiration dates of credit card contracts stored for each member in the member database 61A in a certain cycle (for example, every 24 hours) to extract users whose contracts are about to expire (for example, within one week) and obtains information on the extracted users from the member database 61A, 61B, ... to be stored in the prospective contract-renewal members file 601A, 601B, ...

The second function of the credit company's server 60A, 60B, ... is the determination as to approval or denial of credit-card contracts or transactions. The credit company's server 60A, 60B, ... pre-stores criteria for examining approval or denial of credit card contracts, receives from the mobile station 100 the contents entered by the user according to the entry screen for sign-up, and examines whether or not the credit card contract can be approved based on the entered contents and examination criteria. As a result of the examination, if the credit card contract is approved, credit card contract information to be stored in the magnetic stripe 160 of the mobile station 100 is generated and given to the mobile station 100.

In addition, when a user performs shopping with a credit card, this credit company's server 60A, 60B, ... decides whether or not the shopping with the credit card taking place is valid by using credit information given from the CAT 40a, 40b, ... (or from the merchant's server 80C, 80D, ...) and various information stored

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in the member database, 61A, 61B, ... ; and transmits the results thereof to the CAT 40a, 40b, ... (or the merchant's server 80C, 80D, ...) as credit approval or denial information.

Thirdly, the credit company's server 60A, 60B, ... stores user profiles and credit card contract information relating to the contract in the member database 61A, 61B, ... , and data such as credit card purchases that have taken place are stored in the credit database 62A, 62B, ...

Fourthly, the credit company's server 60A, 60B, ... , via the CAFIS network 50, notifies credit payment information to a financial institution having a credit payment transfer account and performs a transfer of the credit payment.

Finally, the credit company's server 60A, 60B, ... obtains information desired by a user from among the information stored in the member database 61A, 61B, ... and the credit database 62A, 62B, ..., and provides the mobile station 100 with them through the Internet 70 and the mobile packet communication network 30.

This credit company's server 60A, 60B, ... stores an encrypted transmission algorithm such as Secure Sockets Layer (SSL), and handles communication thereby with the gateway server 32 and the merchant's server 80C, 80D, ... , thereby protecting the contents of transmission.

The merchant's server 80C, 80D, ... in Fig. 4 is a server which provides so called virtual shops that permit users to shop online. The merchant's server 80C, 80D, ... stores shopping screens to be displayed on the mobile station 100 as data in the HTML format. The shopping screen data include information related with commercial products sold to the user such as the name of the products, product descriptions, and prices.

The merchant's server 80C, 80D, ... receives a credit card shopping request from a user of the mobile station 100, provides a shopping screen thereto, and handles the processing related to the credit card shopping in cooperation with one of the credit company's server 60A, 60B, ... which performs a payment settlement for the credit card shopping.

This merchant's server 80C, 80D, ... stores an encrypted transmission algorithm such as SSL, and handles communication thereby with the gateway server 32 and the credit company's server 60A, 60B, ... , thereby protecting the contents of transmission.

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[2. Operation]

Next, operations of the present embodiment will be described below, classified into the following operational modes.

1. Signing up for a credit card contract
2-a. Shopping with credit card over the counter
2-b. Shopping with credit card through the mobile packet communication network 30
3. Renewing a credit card contract
4. Making changes in registered member information
5. Canceling a credit card contract
6. Disabling a mobile station 100 and its credit function
7. Inquiring one's own credit history

[2-1. Signing Up for Credit Card Contract]

Fig. 11A, Fig. 11B, Fig. 12A, and Fig. 12B are flow charts showing an operation when a user signs up for a credit card contract with a mobile station 100.

Fig. 13A to 13J are diagrams of screen images displayed on the liquid crystal display 132 of the mobile station 100, and shown chronologically corresponding to the operation indicated in Fig. 11A, Fig. 11B, Fig. 12A, and Fig. 12B.

The operation in signing up for a credit card contract will be described hereinafter in reference to Fig. 11A, Fig. 11B, Fig. 12A, and Fig. 12B.

Firstly, in step SP101, a user initiates a call to the gateway server 32 at a predetermined phone number and requests the start of a communication in the packet communication mode.

In step SP 102, the gateway server 32, upon receiving the packet communication mode starting request, starts communication in the packet communication mode with the user at the other end, and transmits to the mobile station 100 service menu screen data stored within itself.

In step SP 103, the mobile station 100 receives the service menu screen data and displays the service menu on the liquid crystal display 132. Fig. 13A is a diagram of a screen image displayed on the mobile station 100 at this time.

In step SP 104, the user selects by a key operation a desired service from among the displayed service menu items. In this case, on the screen indicated in Fig. 13A, the user moves a cursor on the "credit" to select it. Then, the mobile station 100 transmits to the gateway server 32 the selected service request, in this case, the "credit."

In step SP105, the gateway server 32, in response to the received service request, transmits to the mobile station 100

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service menu screen data designating more detailed contents of the service, in this example, detailed contents regarding the "credit."

In step SP106, the mobile station 100 receives the detailed service menu screen data and displays the service menu on the liquid crystal display 132. Fig. 13B is a diagram of a screen image displayed on the mobile station 100 at this time.

In step SP107, the user selects by a key operation a desired service from among the displayed detailed service menu items. In this case, on the screen indicated in Fig. 13B, the user moves a cursor on the "credit card contract" to select it. Then, the mobile station 100 transmits to the gateway server 32 the selected detailed service request, in this case, "credit card contract."

The above-mentioned service menu screen data are transmitted to the mobile station 100 multiple times until the user finally specifies a desired service.

In step SP108, the gateway server 32 receives the detailed service request and transmits, to the mobile station 100, password entry screen data for the user to enter a password.

In step SP109, the mobile station 100 receives the password entry screen data, and a password entry screen is displayed on the liquid crystal display 132. The user enters a password pre-registered in the gateway server 32 in the password entering section of the password entry screen.

Fig. 13C is a diagram of the password entry screen displayed on the mobile station 100 at this time. The user enters the password in the password entering section and moves a cursor to select "enter".

In step SP111, the mobile station 100 transmits the password

10205670 "021802

information entered by the user to the gateway server 32. In step SP113, the gateway server 32 receives the password information.

In step SP 115, the gateway server 32 performs user authentication by matching the password received from the mobile station 100 and the password of the mobile station 100 stored in the subscriber information manager 302.

In step SP117, based on a result of the user authentication, it is determined whether the user is valid or not. When it is approved as a valid user by the determination in step SP117, the routine advances to step SP119, and the gateway server 32, in response to a final service request from the user (a credit card contract request), transmits to the mobile station 100 next screen information to be displayed on the mobile station 100.

On the other hand, if it is not approved as a valid user by the determination in step SP117, the routine proceeds to step SP121, and the gateway server 32 transmits to the mobile station 100 a service denial notification indicating that the credit card contract request from the user cannot be accepted.

Then, in step SP123, the mobile station 100 receives the information transmitted from the gateway server 32. Subsequently in Fig. 12A, in step SP125, a next screen received by the mobile station 100 is displayed on the liquid crystal display 132. In this case, a list of names of credit card companies for which the user can sign up is displayed on the liquid crystal display 132.

Fig. 13D is a diagram of the screen displayed on the mobile station 100 at this time. In the case of receiving the service denial notification, the mobile station 100 displays the notification on its liquid crystal display 132 (not shown), and the procedure ends.

In step SP126, the user selects by a key operation a desired credit card company from among the displayed credit card companies. In other words, the user moves a cursor on a desired credit card company on the screen shown in Fig. 13D to select “enter.” It is assumed herein that the credit card company A has been selected as an example.

In step SP127, the mobile station 100 transmits to the gateway server 32 the name of the selected credit card company (company A) and the URL of the server 60A thereof.

In step SP129, the gateway server 32 receives the name of the credit card company (company A) and its URL, and transmits a credit card contract request to the credit card company’s server 60A based on the received URL.

The gateway server 32 at this time protects by SSL the contents to be transmitted to the credit card company’s server 60A. Also in the following description of operations, the contents of communications are protected by SSL when communications are performed among the gateway server 32, the credit card company’s server 60A, 60B, ..., and the merchant’s server 80C, 80D, ...

In step SP131, the credit card company’s server 60A receives the credit card contract request from the gateway server 32.

In step SP133, the credit card company’s server 60A sends entry screen data for prompting the user to enter information (e.g. his/her name, age, date of birth, address, phone number, employment, annual income, password, etc.) that are needed for the credit card contract with the company A, out to the Internet 70 addressed to the mobile station 100.

In step SP135, the gateway server 32 receives the entry screen data from the credit card company's server 60A and send it to the mobile station 100.

In step SP 137, the mobile station 100 receives the entry screen data from the gateway server 32 and displays an entry screen on its liquid crystal display 132.

Fig. 13E is a diagram of the screen displayed on the mobile station 100 at this time.

In step SP139, the user enters the necessary information while referring to the entry screen displayed on the liquid crystal display 132. The entry screen is shown in Fig. 13E. The user has to enter various items such as his/her phone number and employment in addition to those shown in the figure such as his/her name, date of birth, and address; the user scrolls down the screen, thereby enabling these other items being displayed in sequence on the liquid crystal display 132.

In step SP 141, the mobile station 100 transmits the entered contents (hereinafter referred to as input information), to the gateway server 32. In step SP143, the gateway server 32 receives the input information and transmit them to the credit card company's server 60A. Along with them, in step SP145, the gateway server 32 transmits the input information to the credit card company's server 60A and a notification of credit card contract application receive completion to the mobile station 100.

Then in step SP147, the mobile station 100 receives the receive completion notification from the gateway server 32 and display it on the liquid crystal display 132, thereby notifying the user. Fig. 13F is a diagram of the receive completion notification

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screen displayed on the mobile station 100 at this time.

On the other hand, in step SP149, the credit card company's server 60A receives the input information from the gateway server 32. In step SP151, the credit card company's server 60A determines whether to approve or deny the credit card contract with regard to the received input information by referring to the examination criteria stored within itself.

In step SP153, if the contract is denied as a result of the examination by the server 60A, the company A's server 60A proceeds to step SP155 and sends out to the Internet 70 a contract denial notification addressed to the mobile station 100.

If the contact is approved as a result of the determination in step SP153, the procedure of the company A's server 60A advances to step SP157 for generating new credit card contract information and sends out to the Internet 70 a contract approval notification and the generated credit card contract information addressed to the mobile station 100.

Then, in step SP159, the credit card company's server 60A stores in the member database 61A user profiles and credit card contract information with regard to this contract.

In step SP161, the gateway server 32 receives the contract denial notification or the contract approval notification and credit card contract information from the credit card company's server 60A, and once stores those information inside.

In step SP163, the gateway server 32 pages the mobile station 100 and transmits a notification indicating that it has received information addressed to the mobile station 100 from the credit card company's server 60A.

In step SP165, the mobile station 100 receives an information receive notification from the gateway server 32 and displays it on the liquid crystal display 132, thereby notifying the user. Fig. 13G is a diagram of the screen displayed on the mobile station 100 at this time.

Then, in step SP167, by a key operation by the user who has seen the display, the mobile station 100 transmits to the gateway server 32 an information acquiring request to request the acquiring of the information stored therein. In other words, the user selects "refer to" on the display shown in Fig. 13G, by which the information acquiring request is transmitted from the mobile station 100 to the gateway server 32.

In step SP169, the gateway server 32 receives the information acquiring request from the mobile station 100, and in response thereto, transmits to the mobile station 100 the contract denial notification, or the contract approval notification and the credit card contract information.

In step SP171, the mobile station 100, receives the contract denial notification, or the contract approval notification and the credit card contract information from the gateway server 32.

In step SP173, the mobile station 100 displays the received contents on its liquid crystal display 132. The mobile station 100, when it has received the credit card contract approval notification and the credit card contract information, stores the received credit card contract information in the credit card contract ROM 123.

Fig. 13H is a diagram of the screen showing the notification of credit card contract denial.

Fig. 13I, on the other hand, is a diagram of the screen showing the notification of credit card contract approval. The user selects "next" on this screen, which in turn changes to the next screen (Fig.13I). Fig. 13J is a screen for confirming the contents of the credit card contract.

As shown in Fig. 13J, on this screen, such information are displayed as "credit number" and "expiration date."

The screen information shown in Fig. 13J are stored in the credit card contract ROM 123, which can be displayed on the liquid crystal display 132 by a specific operation by the user, thereby enabling the user to confirm the contents of the credit card contract.

As described so far, the mobile station 100 owned by a user and the credit card company's server 60A, 60B, ... owned by a credit card company conducts the processing for a credit card contract by wireless communication means, thereby enabling the quick execution of the processing; specifically, the application for a credit card contract from a user to a credit card company; the notification of approval or denial of the credit; and the provision of credit card contract information from the credit card company to the user.

The above-mentioned operation shown in step SP101 to step SP123 in Fig. 11A and Fig. 11B is the operation mainly from the packet communication request to the user authentication, which is performed in common in the first half sequence of each of the operations in using the credit over the mobile communication network, making changes in registered member information, canceling a credit card contract, and inquiring a credit history, as well as the above-mentioned operation of signing up a credit card contract.

[2-2. Operation in Shopping with Credit Card]

Next, an operation in shopping with credit card using a mobile station 100 will be described.

There are two embodiments in the credit card shopping with the mobile station 100.

They are a) an embodiment wherein credit card contract information on the magnetic stripe 160 are given to the credit card company's server 60 through a CAT 40 at the shop; and b)the other embodiment wherein credit card contract information stored in the credit card contract ROM 123 are given to the credit card company's server 60 through the mobile packet communication network 30, which will be described separately hereinafter.

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[2-2-a. Operation in Over-the-Counter Shopping with Credit Card]

Fig. 14A and Fig. 14B cooperate to form a flow diagram showing the operation of the mobile station 100 and the credit transaction system in the embodiment of using the magnetic stripe 160 at the shop.

First, by a predetermined operation by a user, the processing of the over-the-counter credit shopping begins at the mobile station 100.

In step SP201, the control unit 120 of the mobile station 100 reads out all the credit card contract information stored in the credit card contract ROM 123 to display their company names on the liquid crystal display 132.

In step SP203, the user selects a desired credit card company by a key operation from among the displayed credit card companies. It is assumed herein that the credit card contract with credit card company A has been selected.

On the other hand, if the number of contracted credit card companies is just one, the user may enter "OK" on the displayed credit card company.

In step SP205, the control unit 120 of the mobile station 100 gives the credit card contract information of the selected company A to the magnetic writer 150, in turn writes the given information onto the magnetic stripe 160.

After the credit card contract information are written on the magnetic stripe 160, the magnetic card 161 becomes a protrudable state, and the control unit 120 displays the fact of being protrudable on the liquid crystal display 132. Then in step SP207, the user, having confirmed the protrudable state, pushes the card-retracting/protruding key of the mobile station 100, thereby protruding the magnetic stripe 160 portion of the magnetic card 161 out of the mobile station 100.

In step SP209, a salesperson slides the magnetic stripe 160 portion of the magnetic card 161 through a magnetic reader of a CAT (assumed herein as a CAT 40b), which in turn the credit card contract information on the magnetic stripe 160 is read into the CAT 40b.

In step SP211, a salesperson enters sales amount for the credit card shopping into an input interface (not shown) of the CAT 40b.

In step SP213, the CAT 40b, through the CAFIS network 50, transmits to the company A's server 60A credit information including the credit card contract information as well as the entered contents into the CAT 40b.

In step SP215, the credit card company's server 60A receives the credit information from the CAT 40b.

In step SP217, the credit card company's server 60A searches in the member database 61A based on the received credit information, and determines whether or not the requested shopping with the credit card is valid. This determination is to see if the credit card is not expired, if the credit limit is not over, if the magnetic stripe on the backside is not disabled, or if the credit card contract itself has no effect.

When it is determined as invalid as a result of the determination in step SP217, the processing by the company A's server 60A advances to step SP219 and transmits to the CAT 40b through the CAFIS network 50 a notification that the requested credit transaction has been denied (and a reason for the credit denial, if necessary).

On the other hand, when it is determined as valid as a result of the determination in step SP217, the processing by the company A's server 60A advances to step SP221, transmits to the CAT 40b a notification that the requested credit transaction has been approved; further in step SP223, stores the credit record and payment information with regard to this credit card shopping transaction within the credit database 62A.

In step SP225, the CAT 40b receives the above notification from the credit card company's server 60A.

Then in step SP227, the CAT 40b outputs the received notification onto a credit sales slip or a CAT display device (not shown). The salesperson performs a predetermined procedure following the displayed contents. After that, the user writes a signature identical to that on the backside of the magnetic card

161 in the signature section of the credit sales slip with the sales amount written, thereby ending the credit card shopping transaction.

At the time of completing the reading of the credit card contract information on the magnetic stripe 160, the user pushes the card retracting/protruding key of the mobile station 100, and in step SP229, the magnetic card 161 is retracted inside the slot 101 of the mobile station 100.

After the magnetic card is retracted, in step SP231, the control unit 120 of the mobile station 100 orders the magnetic writer 150 to delete the credit card contract information of the company A stored on the magnetic stripe 160, and the magnetic writer 150 executes that.

[2-2-b. Operation in Credit Card Shopping with the Mobile Packet Communication Network]

Fig. 11A, Fig. 11B, Fig. 15A, and Fig. 15B cooperate to form a flow diagram showing the operation for shopping with a credit card using the mobile station 100.

The operation shown in Fig. 11A and Fig. 11B is almost same as the sign-up for a credit card contract, but in step SP107 of Fig. 11A, a user should select "credit card shopping" as a desired service. Description for the rest of operation in Fig. 11A and Fig. 11B shall be omitted.

In step SP301 of Fig. 15A, all the merchants where the shopping with credit cards can be made by a user are displayed on the liquid crystal display 132.

In step SP303, a user selects by a key operation a desired merchant from among the displayed merchants. It is assumed herein that the merchant C has been selected.

In step SP305, the mobile station 100 transmits the selected merchant's name (store C) and the URL of the merchant's server 80C to the gateway server 32.

In step SP307, the gateway server 32 receives the merchant's name (store C) and the URL, and based on the received URL, transmits a credit card shopping request to the merchant's server 80C.

In step SP309, the merchant's server 80C receives the credit card shopping request from the gateway server 32.

In step SP311, the merchant's server 80C, in response to the received credit card shopping request, transmits shopping screen data stored in itself out to the Internet 70 addressed to the mobile station 100.

In step SP313, the gateway server 32 receives the shopping screen data from the merchant's server 80C and transmits to the mobile station 100.

In step SP315, the mobile station 100 receives the shopping screen data from the gateway server 32, and a shopping screen is displayed on the liquid crystal display 132.

In step SP317, the user selects a product to purchase referring to the shopping screen displayed on the liquid crystal display 132.

When the selecting of a product is completed, the mobile station 100 reads out all the credit card contract information stored in the credit card contract ROM 123, and the names of credit companies thereof are displayed on the liquid crystal display 132. Then in step SP319, from among the displayed credit card companies, the user selects a credit card company to be used in this credit card shopping. It is assumed herein that the credit card company B has been selected.

In step SP321, the mobile station 100 transmits information on the selected product and its price, credit card contract information with the company B, the URL of the merchant's server 80C, and the URL of the credit company's server 60B to the gateway server 32.

In step SP323, the gateway server 32 receives these information from the mobile station 100 and, after seeing its contents, transmits the information to the merchant's server 80C.

In step SP325, the merchant's server 80C receives the input information from the gateway server 32. Then, the merchant's server 80C, among the received information, transmits the credit card contract information and sales amount information to the credit company's server 60B.

In step SP327, the credit company's server 60B receives these credit information from the merchant's server 80C. In step SP329, the credit company's server 60B retrieves the received credit information in the member database 61B and determines whether the requested credit card shopping is valid or not.

This determination is to check items such as if the credit card contract is not expired; if the credit limit is not exceeded; if the magnetic card is not disabled; or if the credit card contract itself has no effect.

As a result of the determination in step SP329, when it is determined as invalid, the routine advances to step SP331, and the credit company's server 60B transmits a notification indicating the denial of the requested credit card shopping to the merchant's

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server 80C.

On the other hand, as a result of the determination in step SP329, when it is determined as valid, the process of the credit card company's server 60B advances to step SP333, transmits a credit approval notification to the merchant's server 80C, and further stores the credit history and payment information in the credit database 62B in step SP335.

In step SP337, the merchant's server 80C receives the notification from the credit card company's server 60B. Then in step SP339, the merchant's server 80C transmits the received notification to the gateway server 32 addressed to the mobile station 100. If the notification is a credit approval notification, the merchant's server 80C stores the product selected by the user as credit card sales information and performs a predetermined processing such as sending the product to the user.

In step SP341, the gateway server 32 receives the notification from the merchant's server 80C and transmits to the mobile station 100.

In step SP343, the mobile station 100 receives the notification from the gateway server 32 and displays the received contents on the liquid crystal display 132, thereby notifying the user.

[2-3. Operation in Renewing the Credit Card Contract]

Next, the operation in renewing a credit card contract will be described.

Fig. 16A and Fig. 16B cooperate to form a flow diagram showing the operational flow in renewing a credit card contract.

In step SP401, the credit card company's server (herein assumed as 60A) creates the prospective contract-renewal members file 601 referring to the member database 60A. In step SP403, the credit card company's server 60A transmits, referring to the prospective contract-renewal members file 601, a contract renewal advance notification to notify the renewal of the credit card contract in advance, out to the Internet 70, addressed to a mobile station (herein assumed as the mobile station 100) of the user with prospective contract renewal.

In step SP405, the gateway server 32, upon receiving the contract renewal advance notification, pages the mobile station 100 to redirect the above notification.

In step SP407, the mobile station 100 receives the contract renewal advance notification from the gateway server 32 and displays the received notification on its liquid crystal display 132.

In step SP409, the mobile station 100, by a key operation by the user, transmits response information in response to the displayed contract renewal advance notification. The response information designates either "will renew" or "will not renew" with regard to the contract renewal.

In step SP411, the gateway server 32 receives the response information from the mobile station 100 and transmits to the credit card company's server 60A.

In step SP413, the credit card company's server 60A receives the response information from the gateway server 32.

In step SP415, the credit card company's server 60A, based on the received response information, determines whether or not the credit card contract with the user of the mobile station 100 can

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be renewed.

As a result of the determination in step SP415, if the contract is renewable, the routine advances to step SP417, and the credit company's server 60A generates renewed credit card contract information, the new credit card contract information being sent out to the Internet 70 addressed to the mobile station 100 as well as being stored in the member database 60A.

As a result of the determination of step SP415, if the contract is not renewable, the routine advances to step SP421, and the credit card company's server 60A deletes information on the user whose contract cannot be extended, the information being stored in the member database 61A. Then in step SP423, the credit card company's server 60A sends a notification designating that the contract cannot be renewed, out to the Internet 70, addressed to the mobile station 100.

Then in step SP425, the gateway server 32 receives from the credit card company's server 60A the renewed credit card contract information or the contract non-renewal notification and stores them for the time being.

Then in step SP427, the gateway server 32 pages the mobile station 100 and transmits a notification designating that information addressed to the mobile station 100 from the credit card company's server 60A have been received.

In step SP429, the mobile station 100 receives the information receive notification data from the gateway server 32 and displays them on its liquid crystal display 132, thereby notifying the user.

In step SP431, by a key operation by the user who has seen the display, the mobile station 100 transmits to the gateway server

32 a request for requesting to obtain the information stored therein.

In step SP433, the gateway server 32 receives the information obtaining request from the mobile station 100, in response to which, the gateway server 32 transmits the after-renewed credit card contract information or the contract non-renewal notification stored therein to the mobile station 100.

In step SP435, the mobile station 100 receives the renewed credit card contract information or the no-contract-renewal notification data from the gateway server 32 and displays them on its liquid crystal display 132.

In step SP437, the mobile station 100, when it has received the renewed credit card contract information, updates information such as an expiration date. Alternatively, when it has received the effect of no-contract-renewal, the credit card contract information stored in the credit card contract ROM 123 is deleted after the expiration of a term of validity.

If the user does not respond to the credit card contract advance notification given to the mobile station 100 even after the expiration date, it is regarded that the user has responded "YES" to the contract renewal; the credit card company server 60A transmits credit card contract information renewed at the time of the expiration to the mobile station 100 via the gateway server, and the mobile station 100 updates information such as an expiration date.

[2-4. Operation in Changing the Registered Member Information]

Also in the case of changing member's name and address, it is possible to make these changes using a mobile station 100. An operation in making changes in a credit card contract will be described hereinafter.

Fig. 11A, Fig. 11B, Fig. 17A, and Fig. 17B cooperate to form a flow diagram showing the operation, using the mobile station 100, in a credit card contract.

The operation shown in Fig. 11A and Fig. 11B is almost same as the sign-up of a credit card contract, but in step SP107 of Fig. 11A, a user should select "change in registered member information" as a desired service. Description for the rest of the operation will be omitted.

In step SP501 of Fig. 17A, all the credit card companies with which the user is under contract are displayed on the liquid crystal display 132.

In step SP503, the user selects by a key operation a desired credit card company from among the displayed credit card companies. Here, it is also possible to select all the credit card companies. It is assumed here that the credit card company A has been selected.

In step SP505, the mobile station 100 transmits the name of the selected credit card company to the gateway server 32.

In step SP509, the gateway server 32 receives the name of the credit card company from the mobile station 100 and transmits a request for making changes in the registered member information toward the credit card company's server 60A.

In step SP511, the credit card company's server 60A receives the request for making changes in the registered member information.

In step SP513, the credit card company's server 60A sends change screen information of the credit card contract of the company

A out to the Internet 70 addressed to the mobile station 100.

In step SP515, the gateway server 32 receives the change screen information from the credit card company's server 60A via the Internet and transmits the received screen information addressed to the mobile station 100.

In step SP517, the mobile station 100 receives the change screen information from the gateway server 32 and displays a change screen on the liquid crystal display 132.

In step SP519, the user enters items to change referring to the change screen displayed on the liquid crystal display 132.

In step SP521, the mobile station 100 transmits the entered change items to the gateway server 32.

In step SP523, the gateway server 32 receives the changed items and transmit them to the credit card company's server 60A.

In step SP525, the credit card company's server 60A receives the changed items.

In step SP527, the credit card company's server 60A changes user profiles and attributes associated with the credit card contract stored in itself, based on the received changed items.

Once the changing processing is complete, the credit card company's server 60A advances to step SP529 and sends a notification to designate the completion of change-in-contract processing out to the Internet 70 addressed to the mobile station 100.

In step SP531, the gateway server 32 receives via the Internet 70 the notification of completion to be transmitted to the mobile station 100.

In step SP533, the mobile station 100 receives the notification of completion from the gateway server 32, and in step

SP535, the mobile station 100 displays the received notification of completion on its liquid crystal display 132.

[2-5. Operation in Canceling a Credit Card Contract]

It is possible to use this system also in the processing for canceling a credit card contract. An operation in a credit card contract using a mobile station 100 will be described hereinafter.

Fig. 11A, Fig. 11B, and Fig. 18 cooperate to form a flow diagram showing the operation of the case where a user cancels a credit card contract using the mobile station 100.

The operation shown in Fig. 11A and Fig. 11B is almost same as the sign-up for a credit card contract, but in step SP107 of Fig. 11A, a user should select "cancel a credit card contract" as a desired service. Description for the rest of the operation shall be omitted.

In step SP601 in Fig. 18, all the credit companies with which the user is under contract are displayed on the liquid crystal display 132.

In step SP603, the user selects, from among the displayed credit card companies, a desired credit card company by a key operation. It is assumed here that the credit card company A has been selected.

In step SP605, the mobile station 100 transmits the name of the selected credit card company to the gateway server 32.

In step SP607, the gateway server 32 receives the name of credit card company from the mobile station 100 and transmits to the credit card company's server 60A a request for canceling the credit card contract.

In step SP609, the credit card company's server 60A receives the credit card contract canceling request from the gateway server 32.

In step SP611, the credit card company's server 60A, based on the received credit card contract canceling request, performs the canceling processing of the credit card contract such as deleting the user profile information and credit card contract attributes information stored in the member database 61A.

In step SP613, the credit card company's server 60A sends out to the Internet 70 a notification that tells that the contract cancellation processing has been completed, addressed to the mobile station 100.

In step SP615, the gateway server 32 receives the notification of completion through the Internet 70, and sends it to the mobile station 100.

In step SP617, the mobile station 100 receives the notification of completion from the gateway server 32.

In step SP619, the mobile station 100 displays the received notification of completion on its liquid crystal display 132.

[2-6. Operation in Disabling the Communication and Credit Card Function of Mobile Station 100]

In cases where a user has lost a mobile station 100 or had it stolen, it is necessary to disable the credit function in order to prevent a third person from illegal use of the mobile station 100. An operation of the mobile station 100 and the control unit in disabling the credit function of the mobile station 100 will be described hereinafter.

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Fig. 19 is a flow chart showing the flow of the process by the mobile station 100 and the control unit of disabling the credit card function of the mobile station 100.

A user who owns the mobile station 100, in the case of losing the mobile station 100, makes a contact with a common carrier who manages the mobile telephone network 20 and the mobile packet communication network 30 by a predetermined method, and requests to disable the calling and credit card function of the mobile station 100.

In step SP701, the communication carrier who has received the above report, by using a specified administrative terminal, makes an access to the subscriber database 331 of the control unit 33, and registers a flag that designates the disablement of communication service for the user and his credit card.

After this operation, the communication service by the mobile station 100 of the subject user and its credit card function become disabled. In the concrete, the operation will be described hereinafter.

First in step SP703, a third person who has illegally gained the mobile station 100 turns on the mobile station 100.

In step SP705, the mobile station 100 uses a particular channel and transmits dispatch information including a notification that tells that the power is on and the identification number of the mobile station 100. The base station that includes the mobile station 100 in its control area (herein assumed as the base station 32) receives the dispatch information concerning the location of the mobile station 100, the dispatch information being sent to the control unit 33.

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In step SP707, the control unit 33 receives the dispatch information from the base station 32. Then in step SP709, the control unit 33 makes an access to the subscriber database 331 and determines presence or absence of the disabling information of the calling and credit card functions of the sender, the mobile station 100.

In step SP711, the control unit 33, which has determined that the disabling information is present, transmits through the base station 32 to the mobile station 100 the effect that the calling and credit card functions of the mobile station 100 are to be disabled.

In step SP713, the mobile station 100 receives an instruction of disabling the calling and credit card functions through the base station 31.

In step SP715, the mobile station 100 performs the process for disabling the calling and credit card functions.

In the process for disabling the calling, the operation of each section which operates for the calling process of the mobile station 100 will be stopped. In the process for disabling the credit card function, the credit card contract information stored in the credit card contract ROM 123 will be deleted.

[2-7. Operation in Inquiring Credit History]

Using a mobile station 100, a user can make an access to the credit card company's server 60A, 60B, ... to inquire various types of information such as credit history and the amount of next payment charged to the user's bank account.

Fig. 11A, Fig. 11B, and Fig. 20 cooperate to form a flow diagram showing an operation when a user inquires a credit history by using the mobile station 100.

The operation shown in Fig. 11A and Fig. 11B is almost same as the sign-up for a credit card contract, but in step SP107 of Fig. 11A, a user should select "credit history" as a desired service. Description for the rest of the operation shall be omitted.

In step SP801 of Fig. 20, all the credit card companies with which the user is under contract are shown on the liquid crystal display 132.

In step SP803, the user selects by a key operation a desired credit card company from among the displayed credit card companies. It is assumed here that the credit card company A has been selected.

In step SP805, the mobile station 100 transmits the name of the selected credit card company (company A) to the gateway server 32.

In step SP807, the gateway server 32 receives the name of the selected credit card (company A) from the mobile station 100 and transmits a request for inquiring the credit history to the credit card company's server 60A.

In step SP809, the credit card company's server 60A receives the request for inquiring the credit history. In step SP811, the credit card company's server 60A retrieves credit history information stored in the credit database 62A.

In step SP813, the credit card company's server 60A transmits the credit history information obtained as a result of the retrieval out to the Internet 70 addressed to the mobile station 100.

In step SP815, the gateway server 32 receives the credit history information via the Internet 70 and transmits the information to the mobile station 100.

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In step SP817, the mobile station 100 receives the credit history information from the gateway server 32. In step SP819, the mobile station 100 displays the received credit history on its liquid crystal display 132.

[B. Modifications]

[B-1. Modifications in Signing Up for a Credit Card Contract]

In the above-mentioned description, all steps of the operation in signing up for a credit card contract are performed in one calling session, but it is not necessarily in this way. In other words, the operation of requesting a credit card contract from the mobile station 100 to the credit card company's server 60 (i.e. from step SP101 in Fig. 11A to step SP149 in Fig. 12B) and the operation of responding from the credit card company's server 60 to the mobile station 100 (i.e. from step SP151 to step SP173 in Fig. 12B)can be separated.

To illustrate, cases can be envisioned such that it takes a considerable amount of time in the examination process of credit card contracts and that a partial or whole examination process being performed by other information processing devices or a human agent, in which cases, it is possible to once end the communication between the mobile station 100 and the credit card companies' server 60, so that the credit card companies' server 60 may notify the result of the examination to the mobile station 100 at a later date.

Further, the processing at the credit card companies' server 60A, 60B, ... in making a credit card contract may only be the processing associated with the operation of requesting a credit card contract.

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For example, the procedure may end in the step SP149 of Fig. 12B, which is followed, in the case of the request for contract being denied, by a notification to that effect over a telephone to the user. Alternatively, in the case of the request being approved, a user is notified to that effect over a telephone, so that he/she goes to the shop of the credit card company to get one's credit card contract information written in the mobile station 100 through an exclusive ROM reader/writer provided therein.

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[B-2. Modifications in Changing Registered Member profiles]

Various changes for registered member profiles can be conceived such as credit limit and card class, i.e. the change from a normal-class credit card to a gold-class card, in addition to the above-mentioned changes in name and address. In such cases, in addition to the above-mentioned group of steps of the operation, it will be necessary to take a step of examination by a credit card company and a step of notification to the mobile station 100 from the credit card company's server 60 of an approved change or a refused change.

[B-3. Modifications in Disabling the Mobile Station 100 and Its Credit Card Function]

Various timings can be conceived for the mobile station 100 to transmit the dispatch information, not being limited to the time when power is turned on.

For example, it can be envisioned such as the time when the mobile station 100 requests a calling service or a packet communication service to the mobile communication network; and the time when the process for the credit use of the mobile station 100 is started at the shop. In other words, it may be set so that the mobile station 100 transmits the information, triggered by some kind of operation by a person who has the mobile station 100. Alternatively, the mobile station 100 may transmit the information at all times or regularly while the power is on.

Further, when the disabling information is registered at the control unit 33, the control unit 33 may page the mobile station 100 relating to the disablement to provide the mobile station 100 with the disabling information. Upon receiving the disabling information, the mobile station 100 transmits a receive confirmation signal, and the control unit 33 receives the receive confirmation signal, thereby confirming that the mobile station 100 has received the disabling information.

Further, the control unit 33, after detecting that there has been some kind of information transmitted from the mobile station 100, may transmit through many base stations 32 the above-mentioned disabling information to each base station's control area at all times or regularly. Then, the mobile station 100 that has received the transmitted disabling information may conduct the disabling of its own credit card function.

It is also possible for the control unit 33 to possess the disabling information only for the calling function of the mobile station 100, to be given to the mobile station 100. Then, the mobile station 100 that has received the disablement-of-calling information may determine its credit card function is also to be disabled, performing the disabling operation of not only its calling but also credit card function.

[B-4. Modifications in the Configurations of the Gateway Server 32, Credit Card Company's Sever 60, and Merchant's server 80]

The credit company's server 60A, 60B, ... and the merchant's server 80 may be connected to, aside from the Internet 70, the gateway server 32 through a private line, or may be provided inside the mobile communication network.

[B-5. Modifications in the Roles of the Gateway Server 32, Credit Card Company's Sever 60, and Merchant's server 80]

The functions of the gateway server 32, the credit company's server 60 and the merchant's server 80, are not limited to the above-mentioned embodiments, but various embodiments can be conceived. For example, a part of functions of the merchant's server 80 and the credit company's server 60 can be carried out by the gateway server 32.

In the first embodiment, the credit card company's server 60A, 60B, ... stores entry screen information and change screen information used for making a credit card contract or changes, but the gateway server 32 instead can store those screen information. As a result, when a request for contract or changes in contract is transmitted from the mobile station 100 to the gateway server 32, the gateway server 32 does not need to access the credit card company's server 60A, 60B, ... to provide entry screen information with the mobile station 100.

Further, the gateway server 32, instead of the credit card company's server 60A, 60B, ... , may conduct an examination for determining approval or denial of credit card contracts. In order

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to do this, the gateway server 32 stores criteria for determining contract approval or denial that are provided in advance from each of the credit card company's servers 60A, 60B, ... , so as to conduct examinations based on these criteria.

Further, the gateway server 32 may store the prospective contract-renewal members file 601. In this case, the gateway server 32 is provided prospective contract-renewal members files 601 from the credit card company's servers 60A, 60B, ... , and based on the given prospective contract-renewal members file 601, further process with the mobile station 100 is carried out.

Also, in the above-mentioned embodiments, the gateway server 32 once stores information from the credit card company's server 60A, 60B, ... (i.e. credit card contract information and other notifications), and transmits information receive notifications to the mobile station 100. Then, in the case of receiving a request for obtaining credit card contract information from the mobile station 100, the gateway server 32 gives the credit card contract information to the mobile station 100.

However, it is not limited thereto. For example, when the gateway server 32 receives some kind of information addressed to the mobile station 100 from the credit card company's server 60A, 60B, ..., it is possible to give the information to the mobile station 100 without giving any prior notification to the mobile station 100, or the information together with some kind of notification. In this case, when the mobile station 100 receives the information from the gateway server 32, it transmits a receive confirmation signal, so that the gateway server 32 confirms that the mobile station 100 has received the information by receiving the reception confirmation signal.

Further, in the above-mentioned embodiment for the credit card shopping through the mobile packet communication network 30, all the input information transmitted from the mobile station 100 are received by the merchant's server 80 through the gateway server 32, and the merchant's server 80 transmits credit card contract information and amount-of-transaction information among the input information to the credit card company's server 60, but it is not limited thereto.

For example, the gateway server 32 may classify contents of the input information into a group of information addressed to the merchant server 80 and the other group of information addressed to the credit card company's server 60, and transmit them separately. That is, the gateway server 32 transmits the sales product information among the input information to the merchant's server 80; and transmits the credit card contract information and amount-of-transaction information to the credit card company's server 60. Then, credit-approval or denial information from the credit card company's server 60 may be transmitted to the mobile station 100 through the merchant's server 80, or from the credit card company's server 60 directly to the mobile station 100 and the merchant's server 80.

Further, the gateway server 32 may store shopping screens and, upon receiving a request from the mobile station 100, provide the stored shopping screen with the mobile station 100.

[B-6. Types of Contracts]

In the above embodiments, the contract has been described

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in terms of the sign-up for credit cards, but it is not limited thereto. Various types of contracts may be envisioned such as opening bank accounts or making loan contracts with financial institutions, making insurance contracts with insurance companies, or acquiring membership with various organizations.

[B-7. Modifications in the Mobile Station 100 and the CAT 40]

[B-7-1. First Modification]

A mobile station 100 may provide credit card contract information with the CAT 40a, 40b, ... by displaying bar codes that correspond to card information read out from the credit card contract ROM 123 and that can be read optically.

Fig. 21 is a block diagram showing a configuration of a mobile station 100 that displays bar codes indicating credit card contract information on the liquid crystal display 132.

This mobile station 100 comprises a transmitter-receiver 110, a control unit 120, a user interface 130 that has a liquid crystal display 132, and a data input/output terminal 140.

Control programs stored in the program ROM 122 include a program for generating bar code data designating credit card contract information.

When there is a need to display credit card contract information, the CPU 121 reads out credit card contract information from the credit card contract ROM 123, generates bar code data designating the credit card contract information in accordance with the bar code generating program and displays the generated bar code on the liquid crystal display 132.

On the other hand, the CAT 40a, 40b, ... is equipped with

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a bar-code reader and capable of reading the bar code displayed on the liquid crystal display 132 of the mobile station 100.

Fig. 22 is a block diagram showing a configuration of a CAT 40 equipped with the bar-code reader.

The CAT 40 comprises, a user interface 41, a transmitter-receiver 42, an output interface 43, a controller 44, and a bar-code reader 45.

The controller 44 controls each section of the CAT 40. The user interface 41 is for a sales person to enter sales amount. The bar-code reader 45 reads the bar code displayed on the liquid crystal display 132 of the mobile station 100. The transmitter-receiver 42 exchanges various information with the CAFIS network 50. The output interface 43 is a printing device of a credit sales slip.

Other configurations and operations are same as the first embodiment.

What to be displayed on the liquid crystal display 132 is not limited to bar codes but may be anything that can be optically read; for example, calra code or veri code.

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[B-7-2. Second Modification]

A mobile station 100 may provide credit card contract information with the CAT 40a, 40b, ... by using an infrared interface that emits infrared rays indicating card information read out from credit card contract ROM 123.

Fig. 23 is a block diagram showing a configuration of the mobile station 100 that provides credit card contract information with the CAT 40a, 40b, ... by infrared rays.

This mobile station 100 comprises a transmitter-receiver 110, a control unit 120, a user interface 130, a data input/output terminal 140, a modulator 170, and an infrared emitter 180.

When there is a need to provide credit card contract information to the CAT 40a, 40b, ... , the CPU 121 reads out credit card information from the credit card contract ROM 123 and gives them to the modulator 170. The modulator 170 modulates infrared ray carrier by signal waves corresponding to the given credit card contract information and gives the modulated infrared rays to the infrared emitter 180. The infrared emitter 180 emits the given infrared rays.

On the other hand, the CAT 40a, 40b, ... is equipped with an infrared receiver as well as a demodulator, by which the infrared rays emitted from the infrared emitter 180 of the mobile station 100 are received and demodulated so as to acquire the credit card contract information.

Fig. 24 is a block diagram showing a configuration of a CAT 40 that is equipped with the infrared receiver and the demodulator.

The CAT 40 comprises a user interface 41, a transmitter-receiver 42, an output interface 43, a controller 44, the infrared receiver 46, and the demodulator 47.

Other configurations and operations here are same as the first embodiment.

[B-7-3. Third Modification]

Further, a mobile station 100 may provide credit card contract information with a CAT 40a, 40b, ... through an existing data input/output terminal for carrying out data input/output with an external device.

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Fig. 25 is a block diagram showing a configuration of the mobile station 100 where credit card contract information are given to the CAT 40a, 40b, ... through the existing data input/output terminal.

This mobile station 100 comprises a transmitter-receiver 110, a control unit 120, a user interface 130, and a data input/output terminal 140.

When there is a need to give credit card contract information to the CAT 40a, 40b, ... , the CPU 121 reads out credit card contract information from the credit card contract ROM 123 and gives them to the data input/output terminal 140. Subsequently, the data input/output terminal 140 provides the given credit card information to a data input/output terminal that is equipped with the CAT 40a, 40b, ...

Fig. 26 is a block diagram showing a configuration of a CAT 40 that is equipped with the data input/output terminal.

The CAT 40 comprises a user interface 41, a transmitter-receiver 42, an output interface 43, a controller 44, and the data input/output terminal 48.

Other configurations and operations here are same as the first embodiment.

[B-7-4. Other Variations in Mobile Station 100 and CAT 40]

In the above-mentioned description concerning the mobile station 100 equipped with a magnetic stripe, the mobile station 100 has only one magnetic stripe 160 to which the magnetic writer 150 writes in credit card contract information every time credit transactions are performed. However, it is not limited thereto.

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For example, it is possible to provide a plurality of magnetic stripes 160 on the magnetic card 161 so that one magnetic stripe corresponds to one credit card contract information item. That is, it means to provide as many magnetic stripes 160 as the number of credit card contracts.

In this case, the CAT 40a, 40b, . . . reads out a magnetic stripe 160 in which card information of the designated credit card company is stored from among a plurality of magnetic stripes 160.

Also, in cases where users carry out credit card shopping only through the mobile packet communication network as mentioned above, the mobile station 100 does not need to have a magnetic stripe 160. This is because it is possible to receive and transmit data to/from the credit card company's server 60A, 60B, ... only with a wireless communication function in the case of the credit card shopping using the mobile packet communication network.

Further, in the above-mentioned description, mobile stations such as cellular phones and PHS possess the card information of credit cards. However, the carrier side is not limited to a mobile station 100 but may be any mobile communication terminal without a calling function, for example, PDA.

Further, in the above-mentioned description, the CAT 40A, 40B,... may give its own information to the mobile station 100. For example, in the case of credit card shopping, information such as the date of sales, merchant, sales amount that are stored in the CAT 40A, 40B,... may be given to a mobile station 100. By doing this, the mobile station 100 can, without making an access the credit card company's server 60A, 60B, ... , accumulate its credit history based on which one is able to total the amount of credit purchases to be drawn from one's bank account.

To do this, in each of the above-mentioned embodiments, the CAT 40a, 40b, ... may be equipped with a data input/output terminal capable of giving the above information by being connected to the data input/output terminal of the mobile station 100.

[B-8. Variations in User Authentication]

The above-mentioned embodiments are such that the gateway server 32 conducts user authentication by matching the password pre-stored in the gateway server 32 and the password entered to the mobile station 100 by its user upon a request for starting a packet communication, but it is not limited thereto.

For example, the mobile station 100 may store a password for user authentication in advance. By doing this, the mobile station 100 can conduct user authentication without carrying out communication with the gateway server 32.

Further, in addition to the password (a first password) stored in the gateway server 32, another password (a second password) may be stored in the credit card company's server 60. In this case, upon starting a packet communication, the first password is matched between the mobile station 100 and the gateway server 32, the second password further being matched between the mobile station 100 and the credit card company's server 60 at the time of shopping with credit card or inquiring for one's credit history. Thus, it is expected to enhance the protection of privacy and security in using credit.

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CLAIMS

1. A mobile communication terminal that is served in a mobile communication network and performs wireless communications, comprising:

a memory for storing card information items with regard to one or a plurality of cards; and

an output interface for reading out from said memory said card information items so as to be output.

2. A mobile communication terminal according to Claim 1,

further comprising selecting means for selecting from said plurality of card information items a card information item desired by a user,

wherein said output interface reads out from said memory the card information item selected by said selecting means so as to be output.

3. A mobile communication terminal according to Claim 1,

wherein said card information are information required for electronic-commerce transactions.

4. A mobile communication terminal according to Claim 3,

wherein said information required for electronic-commerce transactions are credit card information.

5. A mobile communication terminal according to Claim 1,

wherein said card information includes at least information

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for identifying a user.

6. A mobile communication terminal according to Claim 1,

wherein said output interface comprises:

a magnetic recording medium; and

a magnetic writer for reading out the card information selected by said selecting means from said memory to be written into said magnetic recording medium

7. A mobile communication terminal according to Claim 6,

wherein said magnetic recording medium is a card-type magnetic recording medium that can be read by a card reading device.

8. A mobile communication terminal according to Claim 6,

wherein said magnetic recording medium is provided within said mobile communication terminal, said magnetic recording medium being retracted inside said mobile communication terminal or being protruded out of said mobile communication terminal by a predetermined operation on said mobile communication terminal.

9. A mobile communication terminal according to Claim 8,

said magnetic writer, when the magnetic recording medium protruded out of said mobile communication terminal is retracted inside said mobile communication terminal, deletes the card information written in said magnetic recording medium.

10. A mobile communication terminal according to Claim 1,

wherein said output interface comprises

a code displaying device for displaying code that corresponds to card information read out from said memory, the code being optically readable.

11. A mobile communication terminal according to Claim 1,

wherein said output interface is

an infrared interface for emitting infrared rays designating card information read out from said memory.

12. A mobile communication terminal according to Claim 1,

wherein said output interface comprises:

a data input/output terminal for performing data input/output with an external device; and

a data reading device for providing card information read out from said memory with said data input/output terminal.

13. A mobile communication terminal according to Claim 1,

wherein said mobile communication terminal is a mobile telephone for performing wireless telephone communications.

14. A mobile communication terminal, comprising

transmitting means for performing wireless communications with others through a mobile communication network; and

a magnetic recording medium for storing a plurality of card information items.

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ABSTRACT

A mobile communication terminal (the mobile station 100), served in a mobile communication network for performing wireless communications, comprises a transmitter-receiver 110, a controller 120, a user interface 130, a data input/output terminal 140, a magnetic writer 150, and a magnetic stripe 160. Control programs stored in a program ROM 122 include a program for controlling the magnetic writer such as writes or deletes various information into/from the magnetic stripe 160. In a credit card ROM 123 are stored information on the attributes of a credit card contract concluded in advance between a user and a credit card company. The magnetic writer 150 writes credit card contract information provided from the controller 120 to the magnetic stripe 160 or deletes the credit card contract information from the magnetic stripe 160.

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FIG. 1

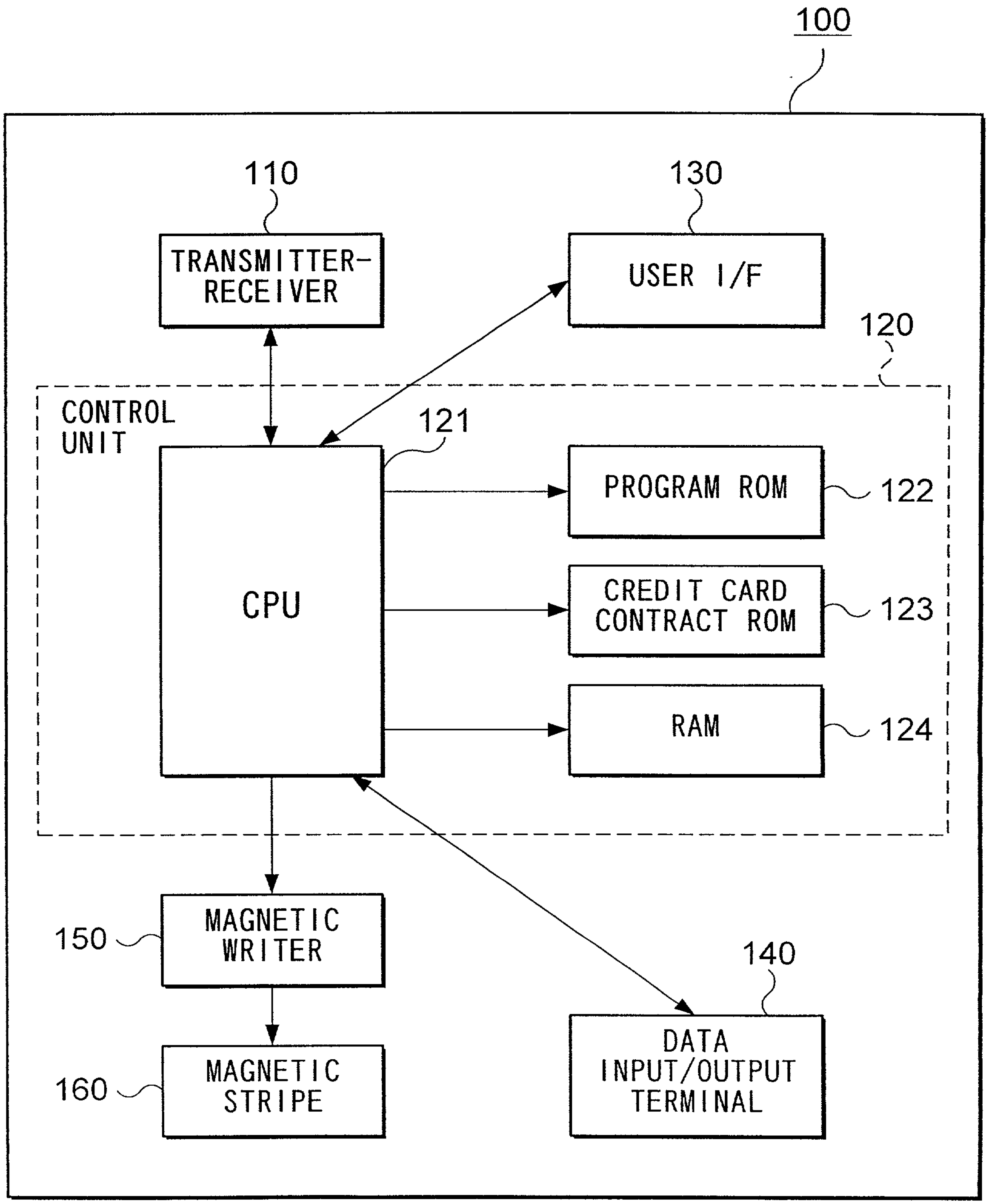
100
110
TRANSMITTER-RECEIVER
130
USER I/F
120
CONTROL UNIT
121
CPU
PROGRAM ROM
122
CREDIT CARD CONTRACT ROM
123
RAM
124
150
MAGNETIC WRITER
160
MAGNETIC STRIPE
140
DATA INPUT/OUTPUT TERMINAL

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FIG. 2

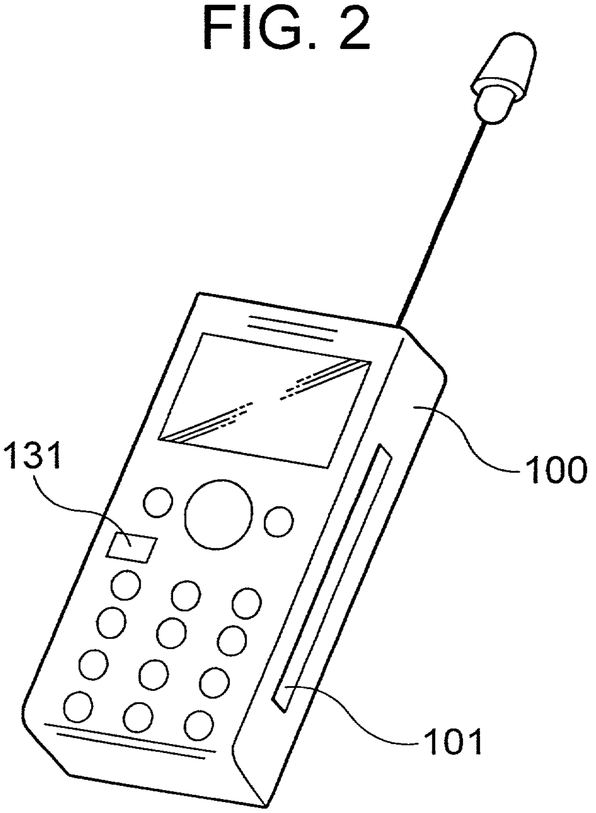
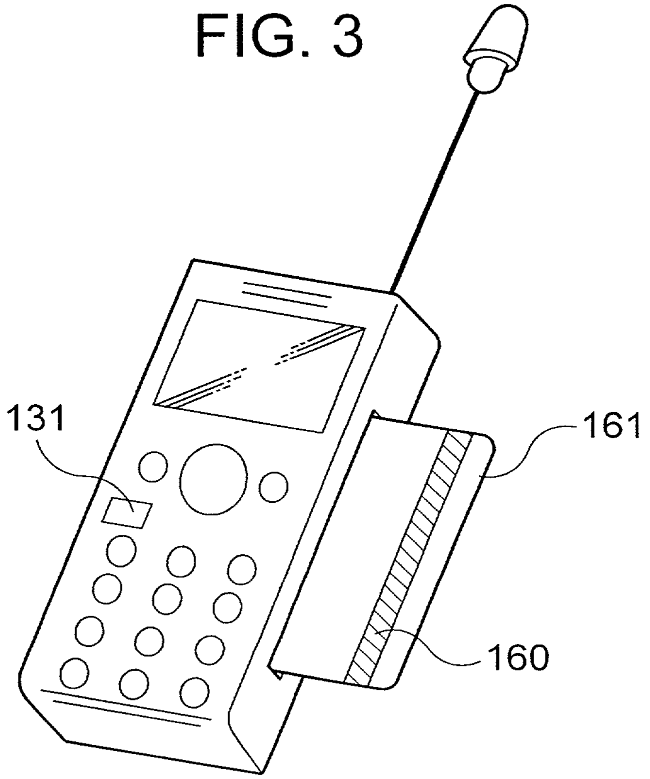


FIG. 3



T02080"0T606860

FIG. 4

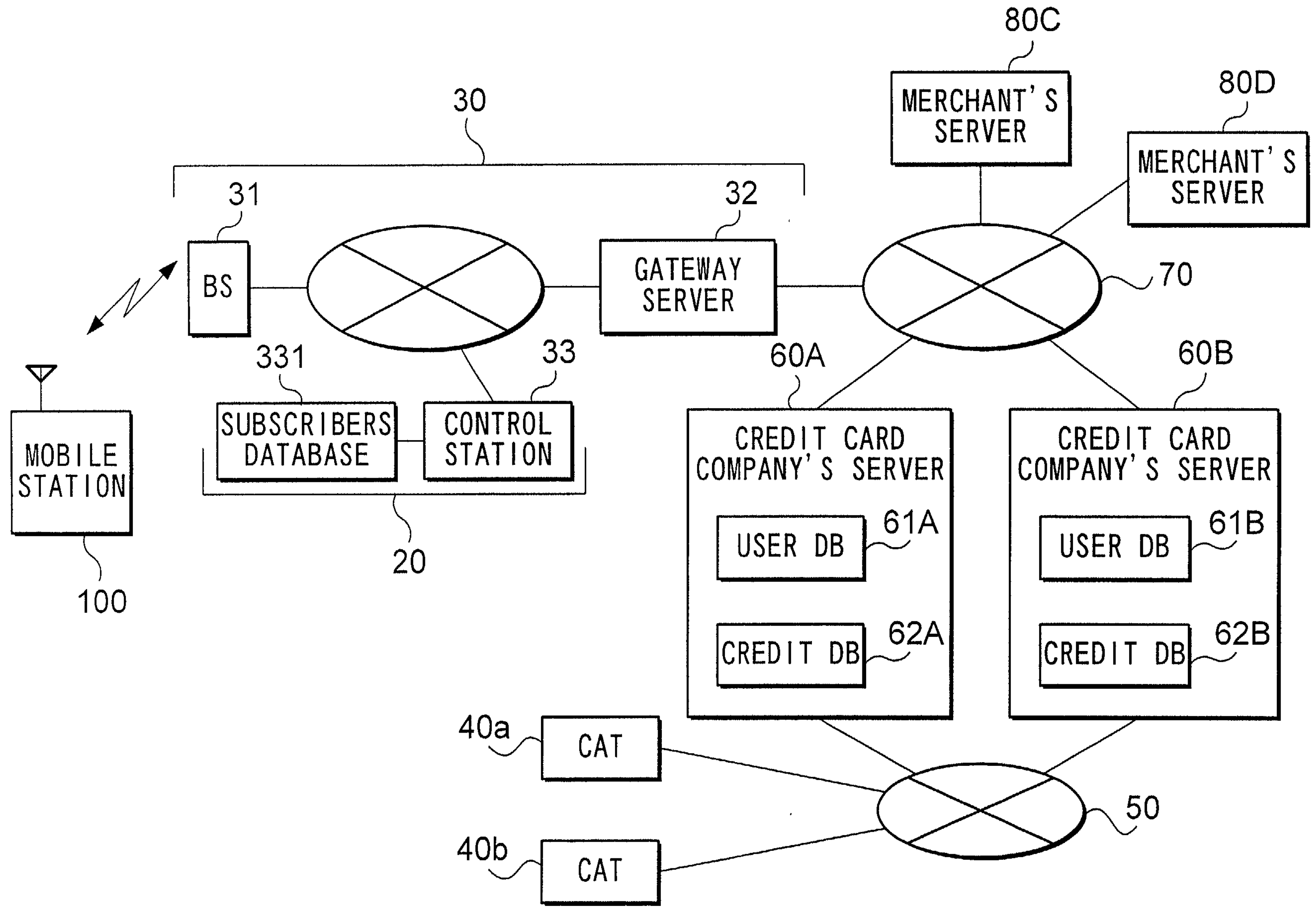

30
31
BS
32
GATEWAY SERVER
80C
MERCHANT'S SERVER
80D
MERCHANT'S SERVER
70
331
SUBSCRIBERS DATABASE
33
CONTROL STATION
20
MOBILE STATION
100
60A
CREDIT CARD COMPANY'S SERVER
USER DB
61A
CREDIT DB
62A
60B
CREDIT CARD COMPANY'S SERVER
USER DB
61B
CREDIT DB
62B
40a
CAT
40b
CAT
50

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FIG. 5

331

TELEPHONE NUMBER	USER'S NAME	SEX	DATE OF BIRTH	DISABLEMENT INFORMATION	......	......
......	......	......	......	......	......	......
......	......	......	......	......	......	......
......	......	......	......	......	......	......
......	......	......	......	......	......	......
......	......	......	......	......	......	......
......	......	......	......	......	......	......
......	......	......	......	......	......	......
......	......	......	......	......	......	......

FIG. 6

304

PHONE NUMBER	USER'S NAME	SEX	DATE OF BIRTH	STORAGE LOCATION	PASSWORD	......
......	......	......	......	......	......	......
......	......	......	......	......	......	......
......	......	......	......	......	......	......
......	......	......	......	......	......	......
......	......	......	......	......	......	......
......	......	......	......	......	......	......
......	......	......	......	......	......	......
......	......	......	......	......	......	......

FIG. 7

NAME	AGE	ADDRESS	PHONE NUMBER	EMPLOYMENT	ANNUAL INCOME	CARD NUMBER	EXPIRATION DATE	CREDIT LIMIT	......
......	......	......	......	......	......	......	......	......	......
......	......	......	......	......	......	......	......	......	......
......	......	......	......	......	......	......	......	......	......
......	......	......	......	......	......	......	......	......	......
......	......	......	......	......	......	......	......	......	......
......	......	......	......	......	......	......	......	......	......
......	......	......	......	......	......	......	......	......	......
......	......	......	......	......	......	......	......	......	......

FIG. 8

USER NAME A				
DATE OF TRANSACTION	MERCHANT	AMOUNT OF TRANSACTION	MONTH SETTLED	AMOUNT SETTLED
......	......	......	......	......
......	......	......	......	......
......	......	......	......	......
......	......	......	......	......
......	......	......	......	......
......	......	......	......	......
......	......	......	......	......
......	......	......	......	......

USER NAME B				
DATE OF TRANSACTION	MERCHANT	AMOUNT OF TRANSACTION	MONTH SETTLED	AMOUNT SETTLED
......	......	......	......	......
......	......	......	......	......
......	......	......	......	......
......	......	......	......	......
......	......	......	......	......
......	......	......	......	......
......	......	......	......	......
......	......	......	......	......

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FIG. 9

NAME	PHONE NUMBER	CARD NUMBER	EXPIRATION DATE	……
……	……	……	……	……
……	……	……	……	……
……	……	……	……	……
……	……	……	……	……
……	……	……	……	……
……	……	……	……	……
……	……	……	……	……

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FIG. 10

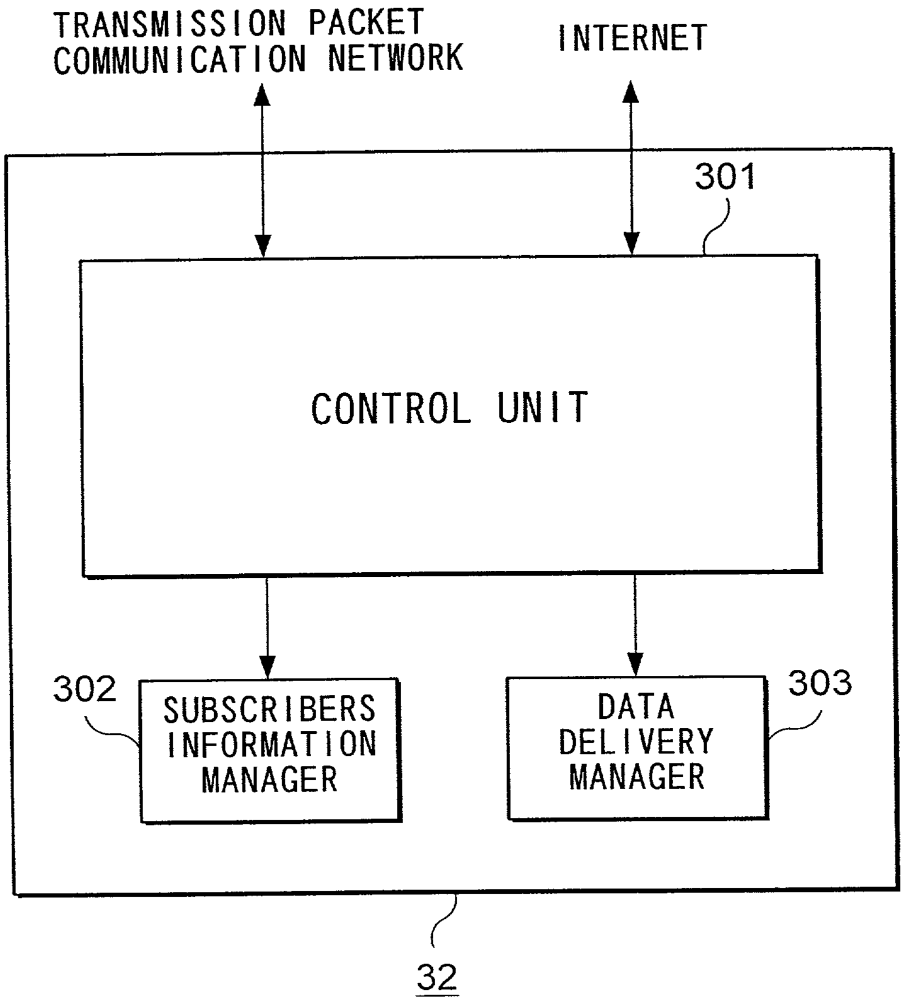
TRANSMISSION PACKET COMMUNICATION NETWORK
INTERNET
301
CONTROL UNIT
302
SUBSCRIBERS INFORMATION MANAGER
DATA DELIVERY MANAGER
303
32

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FIG. 11A

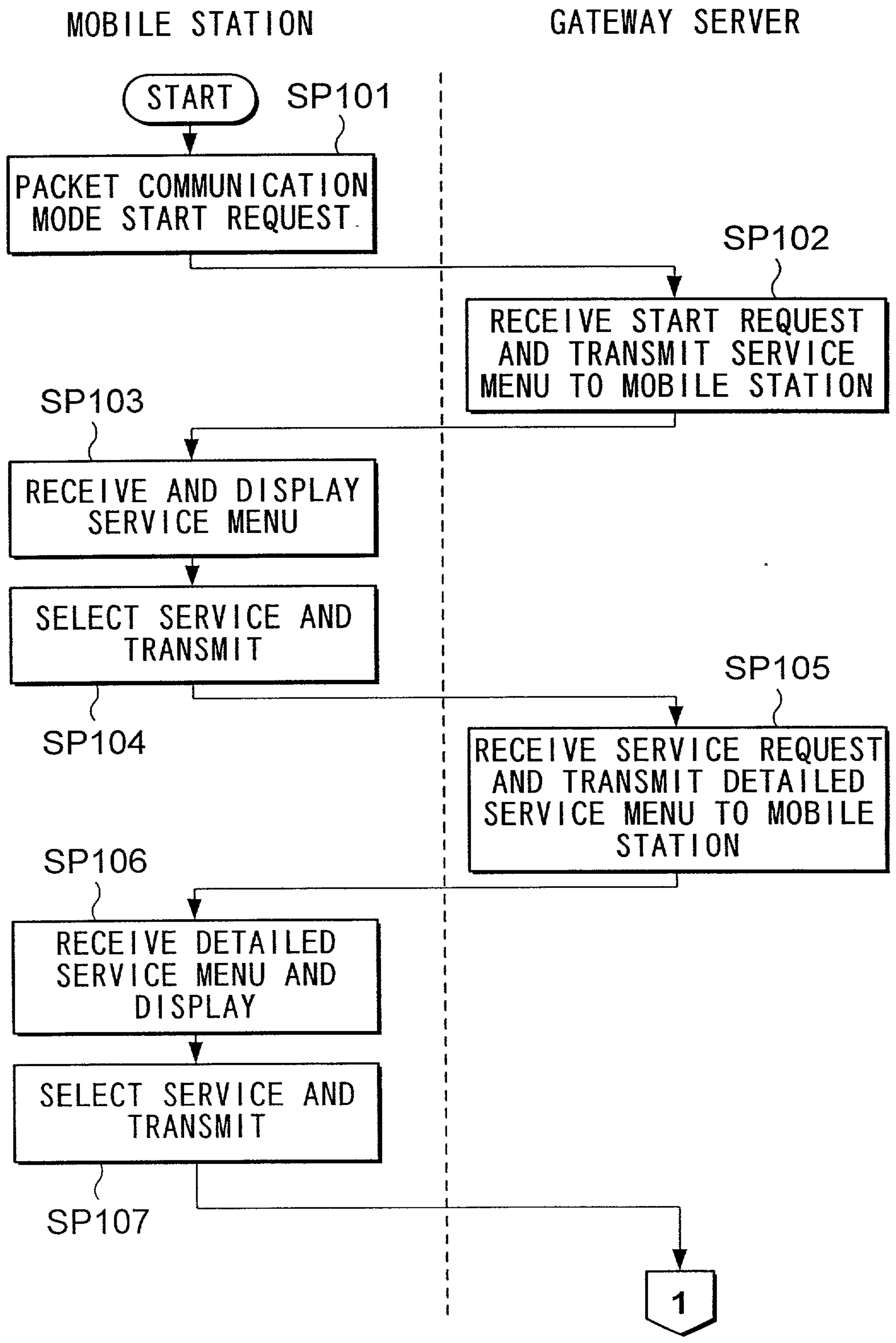
MOBILE STATION
GATEWAY SERVER
START
SP101
PACKET COMMUNICATION MODE START REQUEST
SP102
RECEIVE START REQUEST AND TRANSMIT SERVICE MENU TO MOBILE STATION
SP103
RECEIVE AND DISPLAY SERVICE MENU
SELECT SERVICE AND TRANSMIT
SP104
SP105
RECEIVE SERVICE REQUEST AND TRANSMIT DETAILED SERVICE MENU TO MOBILE STATION
SP106
RECEIVE DETAILED SERVICE MENU AND DISPLAY
SELECT SERVICE AND TRANSMIT
SP107
1

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FIG. 11B

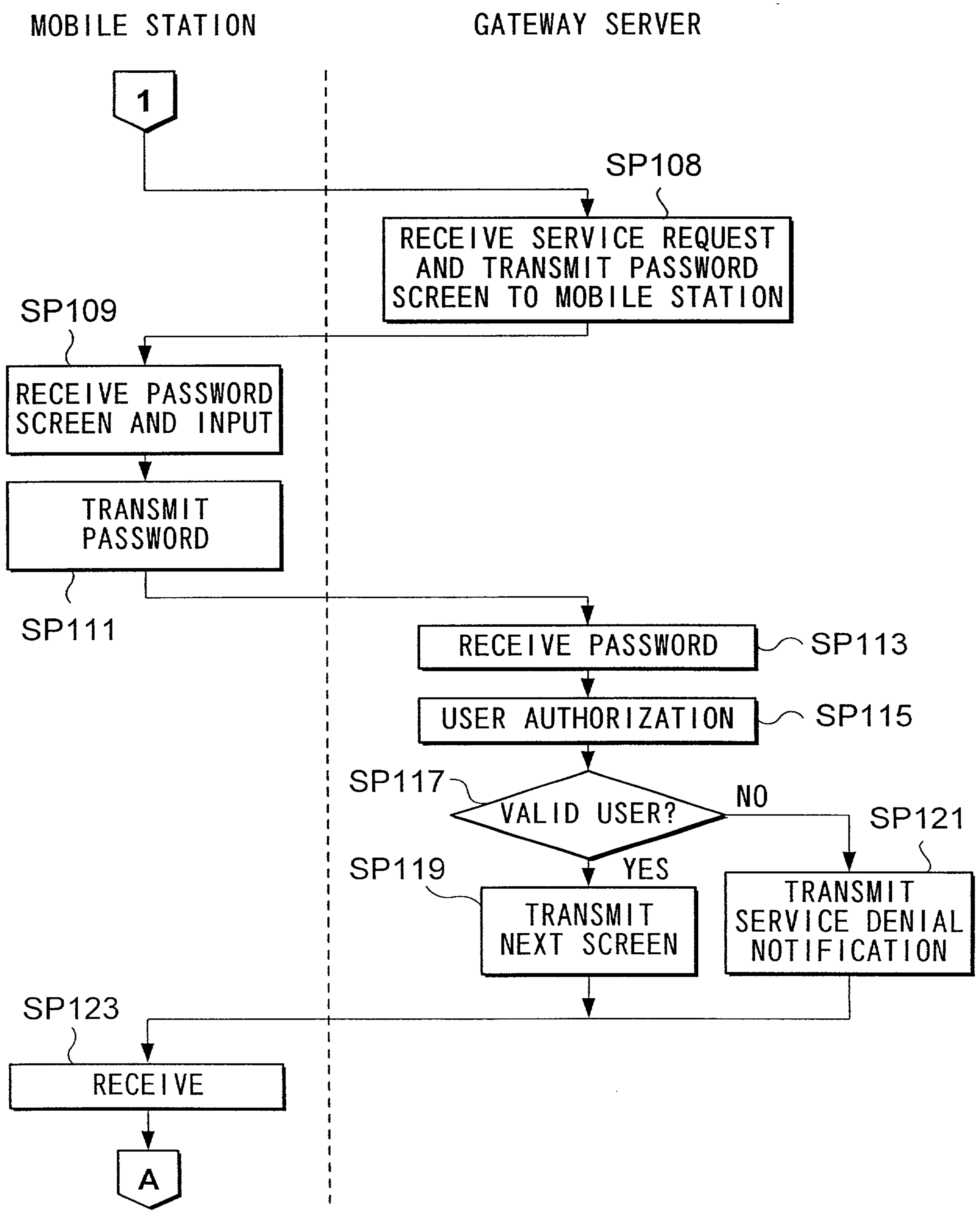
MOBILE STATION
GATEWAY SERVER
1
SP108
RECEIVE SERVICE REQUEST AND TRANSMIT PASSWORD SCREEN TO MOBILE STATION
SP109
RECEIVE PASSWORD SCREEN AND INPUT
TRANSMIT PASSWORD
SP111
RECEIVE PASSWORD
SP113
USER AUTHORIZATION
SP115
SP117
VALID USER?
NO
SP121
SP119
YES
TRANSMIT NEXT SCREEN
TRANSMIT SERVICE DENIAL NOTIFICATION
SP123
RECEIVE
A

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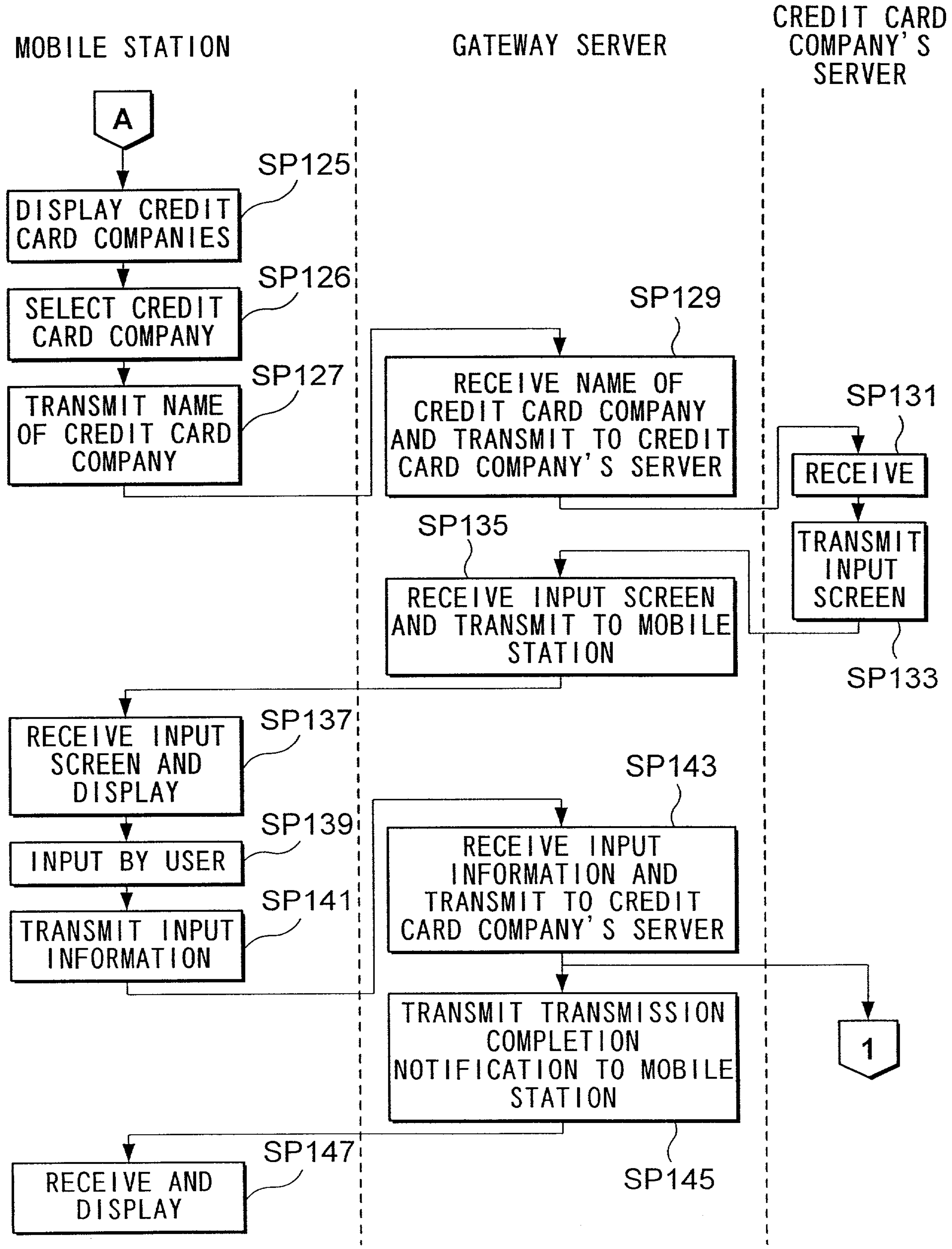
FIG. 12A


MOBILE STATION
GATEWAY SERVER
CREDIT CARD COMPANY'S SERVER
A
DISPLAY CREDIT CARD COMPANIES
SP125
SELECT CREDIT CARD COMPANY
SP126
TRANSMIT NAME OF CREDIT CARD COMPANY
SP127
SP129
RECEIVE NAME OF CREDIT CARD COMPANY AND TRANSMIT TO CREDIT CARD COMPANY'S SERVER
SP131
RECEIVE
TRANSMIT INPUT SCREEN
SP133
SP135
RECEIVE INPUT SCREEN AND TRANSMIT TO MOBILE STATION
RECEIVE INPUT SCREEN AND DISPLAY
SP137
INPUT BY USER
SP139
TRANSMIT INPUT INFORMATION
SP141
SP143
RECEIVE INPUT INFORMATION AND TRANSMIT TO CREDIT CARD COMPANY'S SERVER
TRANSMIT TRANSMISSION COMPLETION NOTIFICATION TO MOBILE STATION
SP145
1
RECEIVE AND DISPLAY
SP147

09890910 .070201

FIG. 12B

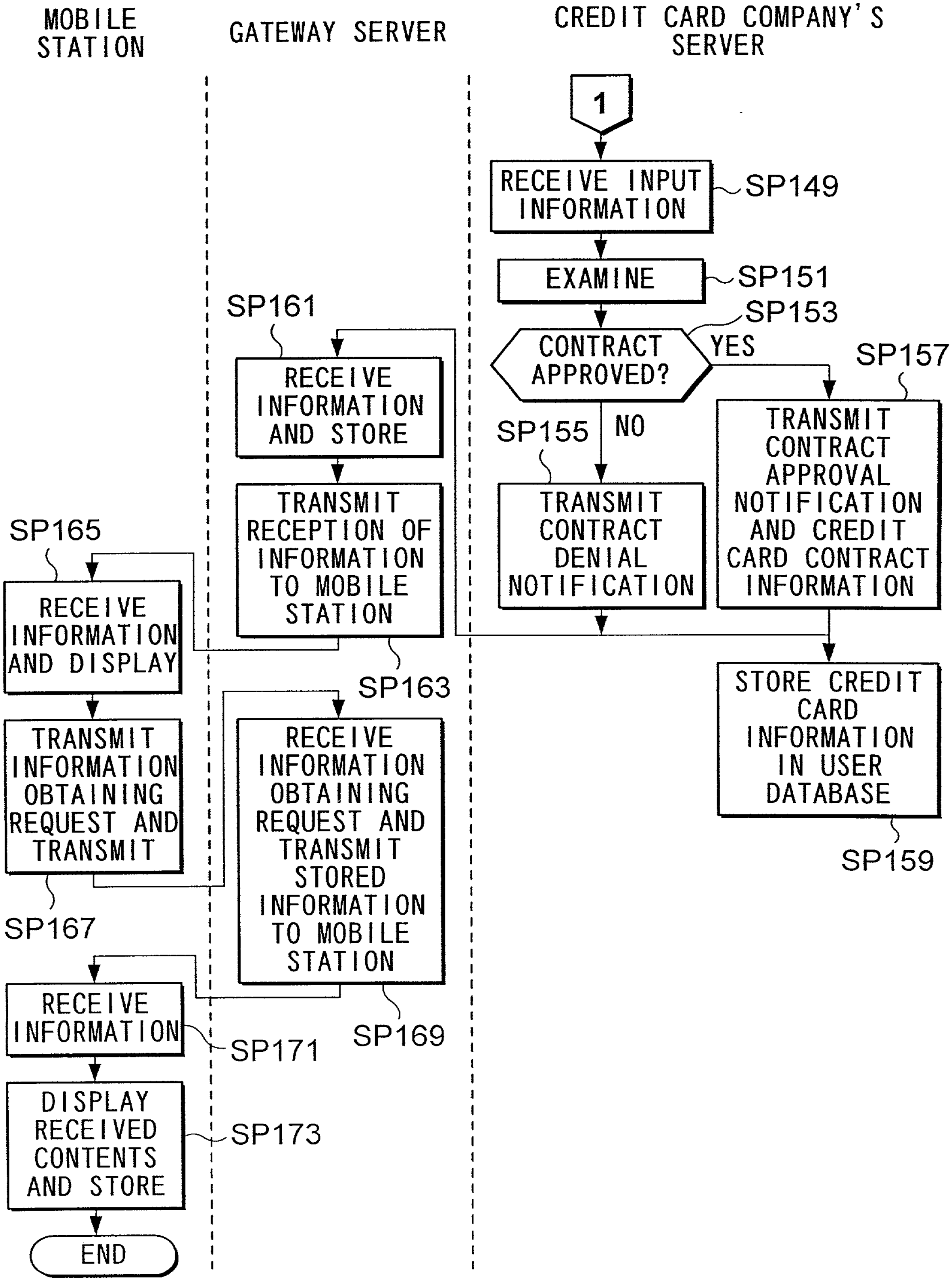

MOBILE STATION
GATEWAY SERVER
CREDIT CARD COMPANY'S SERVER
1
RECEIVE INPUT INFORMATION
SP149
EXAMINE
SP151
CONTRACT APPROVED?
SP153
YES
NO
SP155
TRANSMIT CONTRACT DENIAL NOTIFICATION
SP157
TRANSMIT CONTRACT APPROVAL NOTIFICATION AND CREDIT CARD CONTRACT INFORMATION
STORE CREDIT CARD INFORMATION IN USER DATABASE
SP159
SP161
RECEIVE INFORMATION AND STORE
TRANSMIT RECEPTION OF INFORMATION TO MOBILE STATION
SP163
RECEIVE INFORMATION OBTAINING REQUEST AND TRANSMIT STORED INFORMATION TO MOBILE STATION
SP169
SP165
RECEIVE INFORMATION AND DISPLAY
TRANSMIT INFORMATION OBTAINING REQUEST AND TRANSMIT
SP167
RECEIVE INFORMATION
SP171
DISPLAY RECEIVED CONTENTS AND STORE
SP173
END

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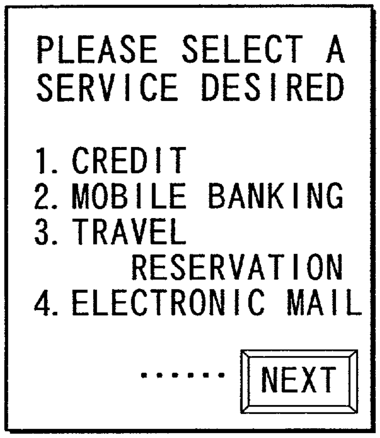
FIG. 13A


PLEASE SELECT A SERVICE DESIRED

1. CREDIT
2. MOBILE BANKING
3. TRAVEL RESERVATION
4. ELECTRONIC MAIL

FIG. 13B

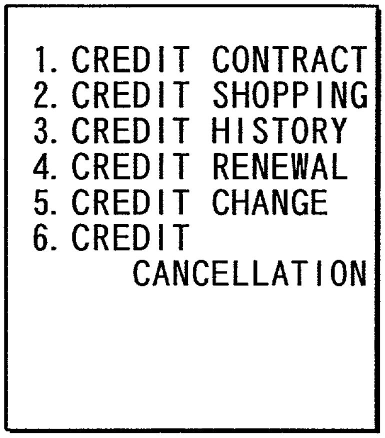
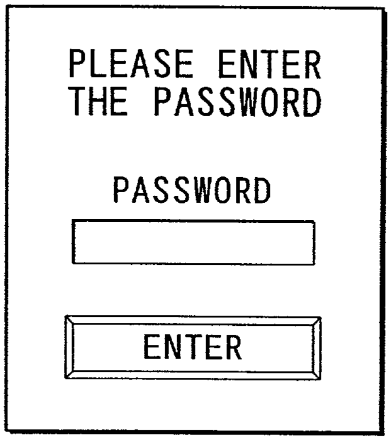
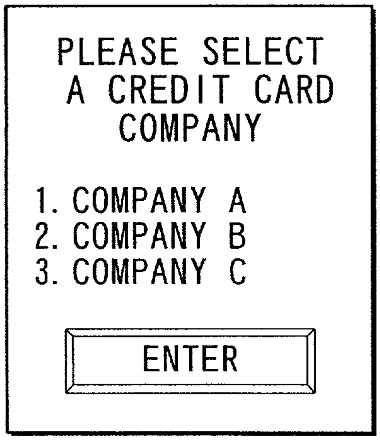

1. CREDIT CONTRACT
2. CREDIT SHOPPING
3. CREDIT HISTORY
4. CREDIT RENEWAL
5. CREDIT CHANGE
6. CREDIT CANCELLATION

FIG. 13C


PLEASE ENTER THE PASSWORD

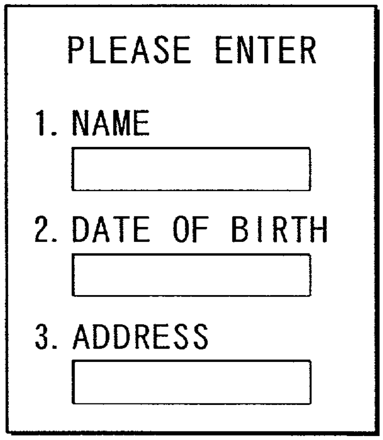
PASSWORD

FIG. 13D


PLEASE SELECT A CREDIT CARD COMPANY

1. COMPANY A
2. COMPANY B
3. COMPANY C

FIG. 13E


PLEASE ENTER

1. NAME

2. DATE OF BIRTH

3. ADDRESS

FIG. 13F

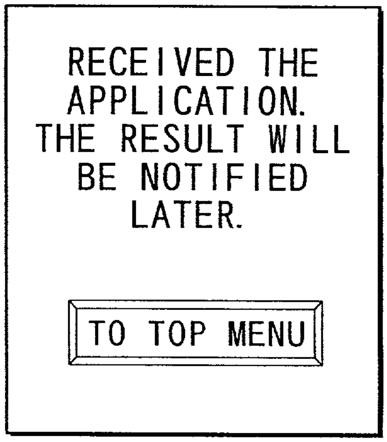

RECEIVED THE APPLICATION. THE RESULT WILL BE NOTIFIED LATER.

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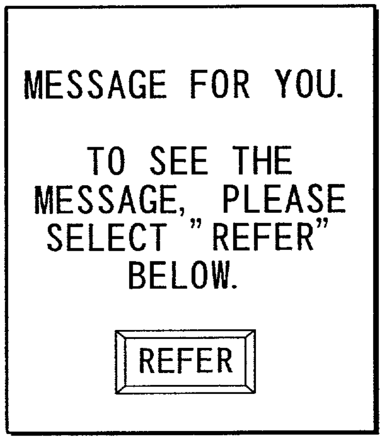
FIG. 13G


MESSAGE FOR YOU.

TO SEE THE MESSAGE, PLEASE SELECT "REFER" BELOW.

FIG. 13H

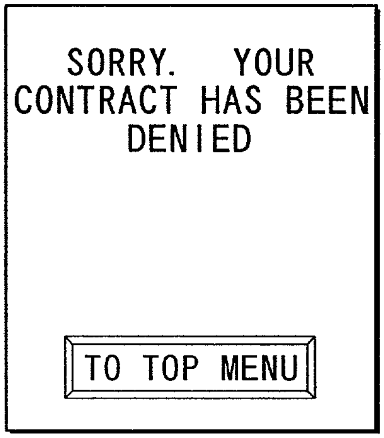
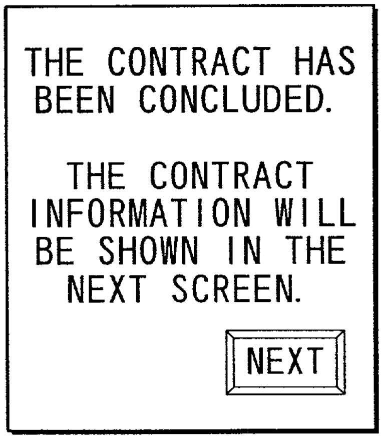
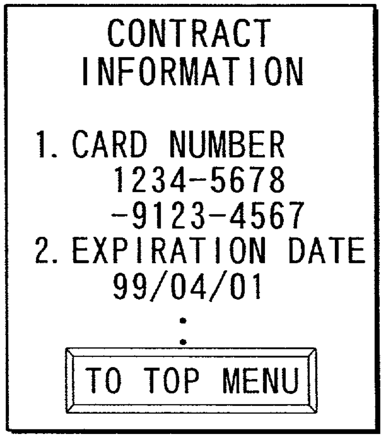

SORRY. YOUR CONTRACT HAS BEEN DENIED

FIG. 13I


THE CONTRACT HAS BEEN CONCLUDED.

THE CONTRACT INFORMATION WILL BE SHOWN IN THE NEXT SCREEN.

FIG. 13J


CONTRACT INFORMATION

1. CARD NUMBER
   1234-5678
   -9123-4567
2. EXPIRATION DATE
   99/04/01
   :

FIG. 14A

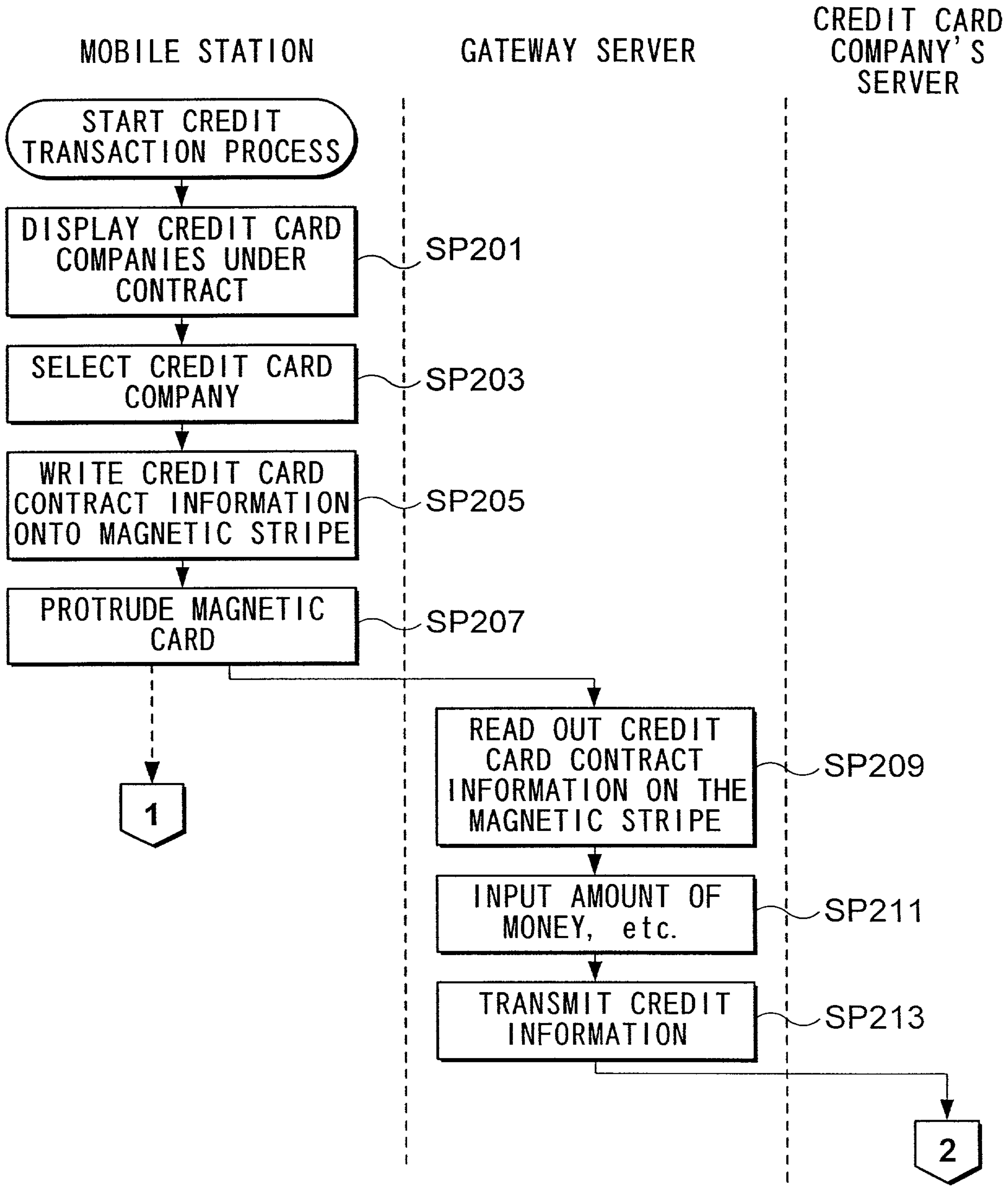

MOBILE STATION
GATEWAY SERVER
CREDIT CARD COMPANY'S SERVER
START CREDIT TRANSACTION PROCESS
DISPLAY CREDIT CARD COMPANIES UNDER CONTRACT
SP201
SELECT CREDIT CARD COMPANY
SP203
WRITE CREDIT CARD CONTRACT INFORMATION ONTO MAGNETIC STRIPE
SP205
PROTRUDE MAGNETIC CARD
SP207
1
READ OUT CREDIT CARD CONTRACT INFORMATION ON THE MAGNETIC STRIPE
SP209
INPUT AMOUNT OF MONEY, etc.
SP211
TRANSMIT CREDIT INFORMATION
SP213
2

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FIG. 14B

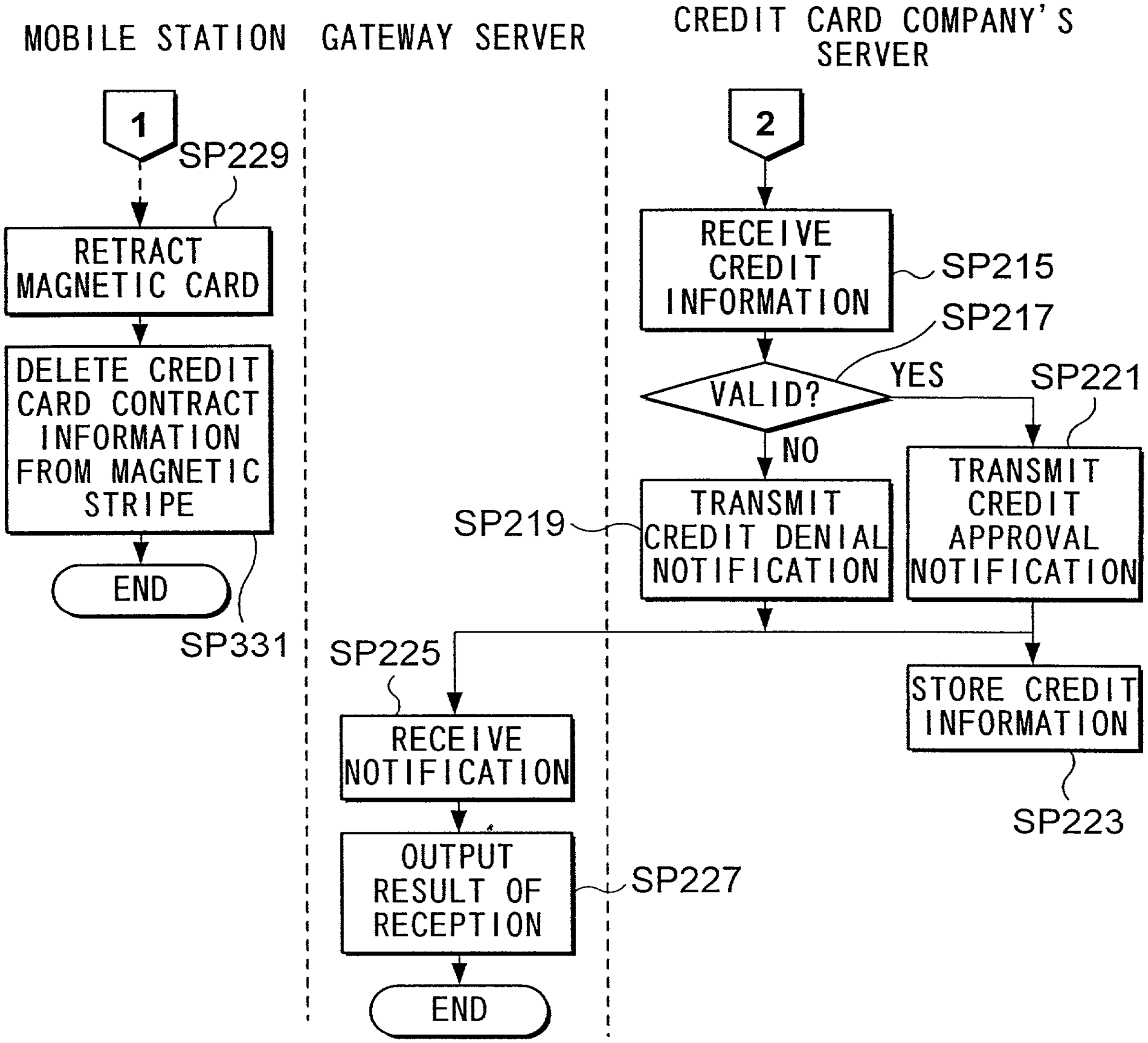
MOBILE STATION
GATEWAY SERVER
CREDIT CARD COMPANY'S SERVER
1
SP229
RETRACT MAGNETIC CARD
DELETE CREDIT CARD CONTRACT INFORMATION FROM MAGNETIC STRIPE
END
SP331
2
RECEIVE CREDIT INFORMATION
SP215
SP217
VALID?
YES
NO
SP221
TRANSMIT CREDIT APPROVAL NOTIFICATION
SP219
TRANSMIT CREDIT DENIAL NOTIFICATION
STORE CREDIT INFORMATION
SP223
SP225
RECEIVE NOTIFICATION
OUTPUT RESULT OF RECEPTION
SP227
END

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FIG. 15A

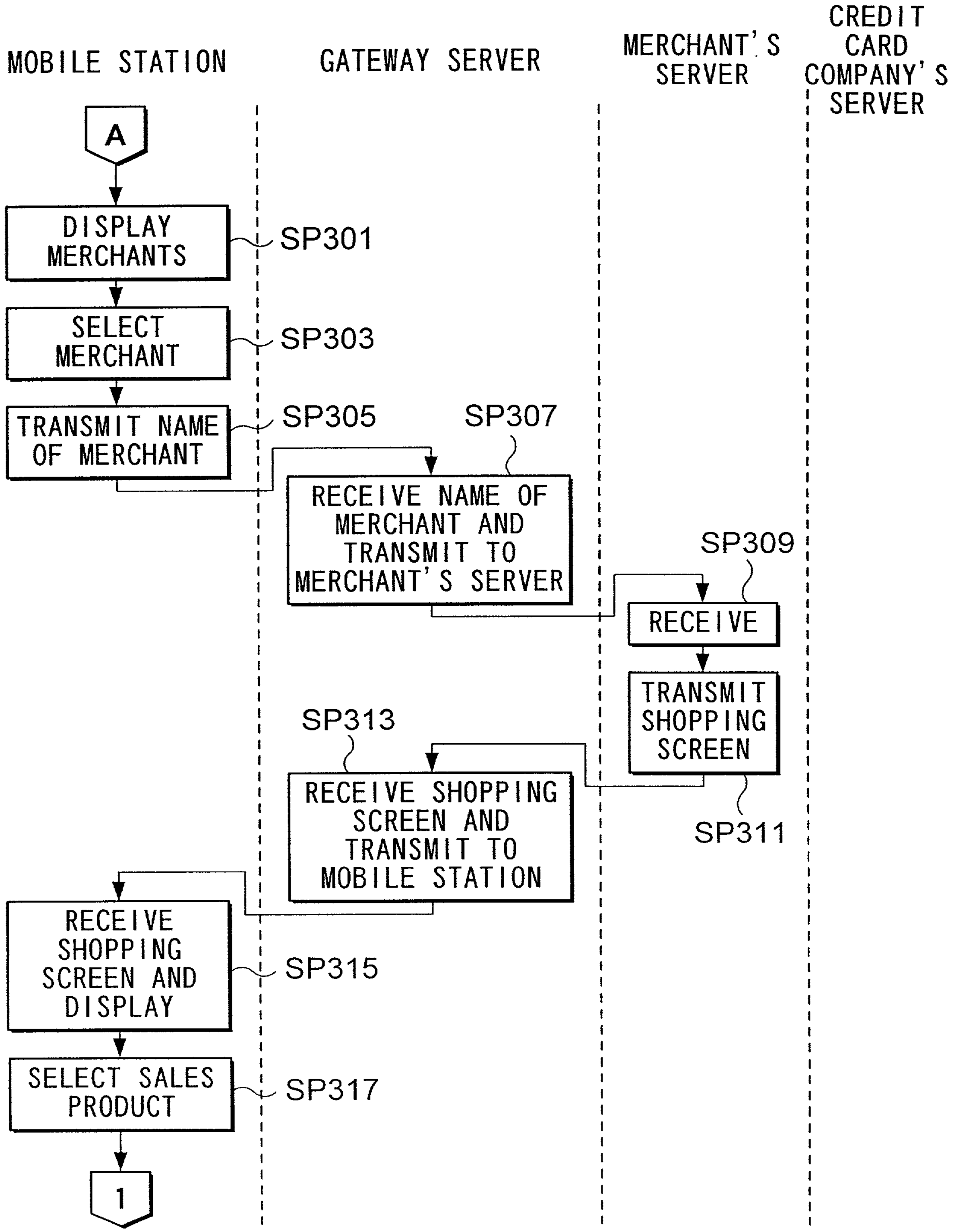
MOBILE STATION
GATEWAY SERVER
MERCHANT'S SERVER
CREDIT CARD COMPANY'S SERVER
A
DISPLAY MERCHANTS
SP301
SELECT MERCHANT
SP303
TRANSMIT NAME OF MERCHANT
SP305
SP307
RECEIVE NAME OF MERCHANT AND TRANSMIT TO MERCHANT'S SERVER
SP309
RECEIVE
TRANSMIT SHOPPING SCREEN
SP311
SP313
RECEIVE SHOPPING SCREEN AND TRANSMIT TO MOBILE STATION
RECEIVE SHOPPING SCREEN AND DISPLAY
SP315
SELECT SALES PRODUCT
SP317
1

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FIG. 15B

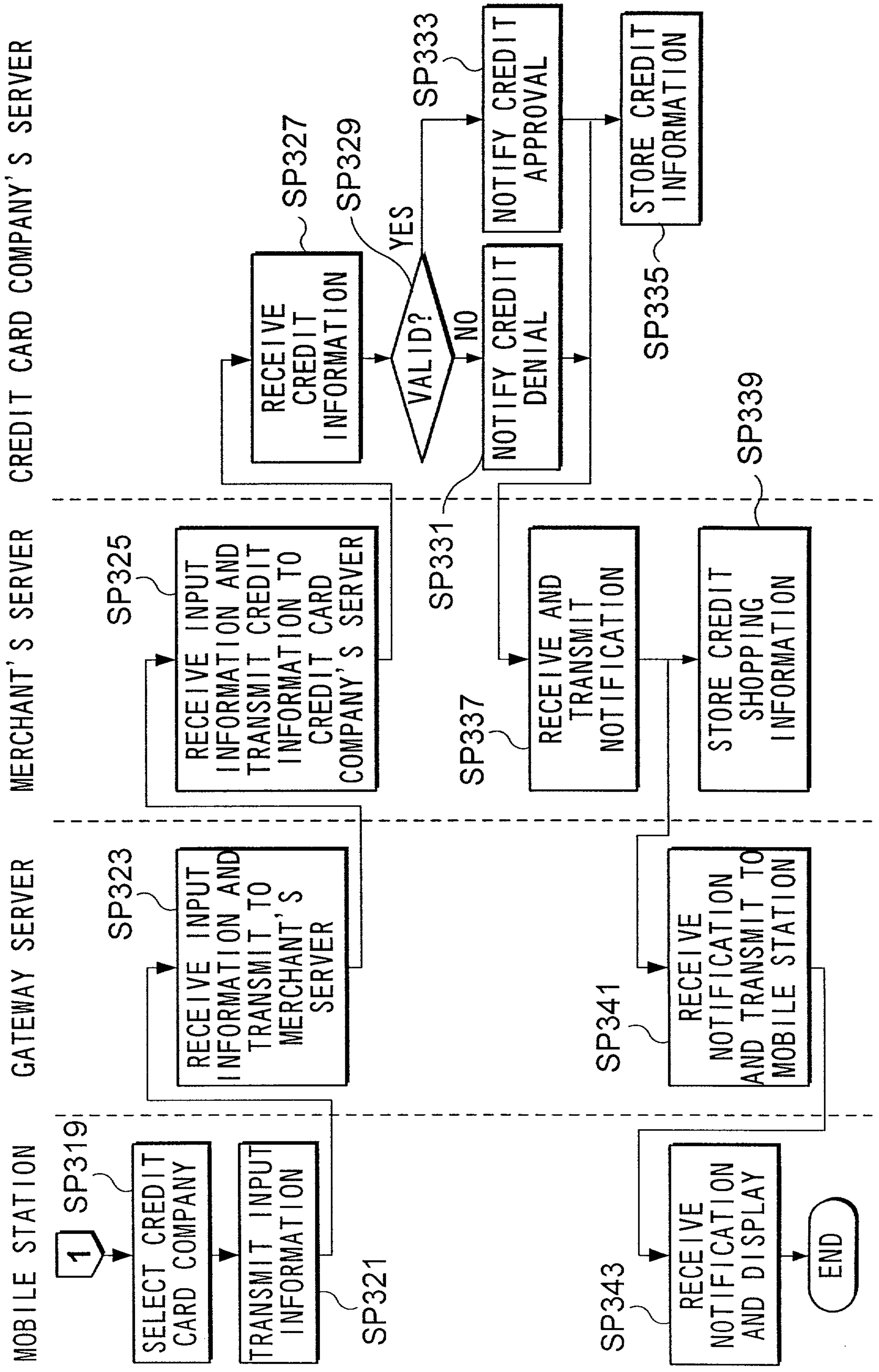
MOBILE STATION
GATEWAY SERVER
MERCHANT'S SERVER
CREDIT CARD COMPANY'S SERVER
1
SP319
SELECT CREDIT CARD COMPANY
TRANSMIT INPUT INFORMATION
SP321
SP323
RECEIVE INPUT INFORMATION AND TRANSMIT TO MERCHANT'S SERVER
SP325
RECEIVE INPUT INFORMATION AND TRANSMIT CREDIT INFORMATION TO CREDIT CARD COMPANY'S SERVER
SP327
RECEIVE CREDIT INFORMATION
SP329
VALID?
YES
NO
SP333
NOTIFY CREDIT APPROVAL
NOTIFY CREDIT DENIAL
SP331
STORE CREDIT INFORMATION
SP335
SP337
RECEIVE AND TRANSMIT NOTIFICATION
SP339
STORE CREDIT SHOPPING INFORMATION
SP341
RECEIVE NOTIFICATION AND TRANSMIT TO MOBILE STATION
SP343
RECEIVE NOTIFICATION AND DISPLAY
END

FIG. 16A

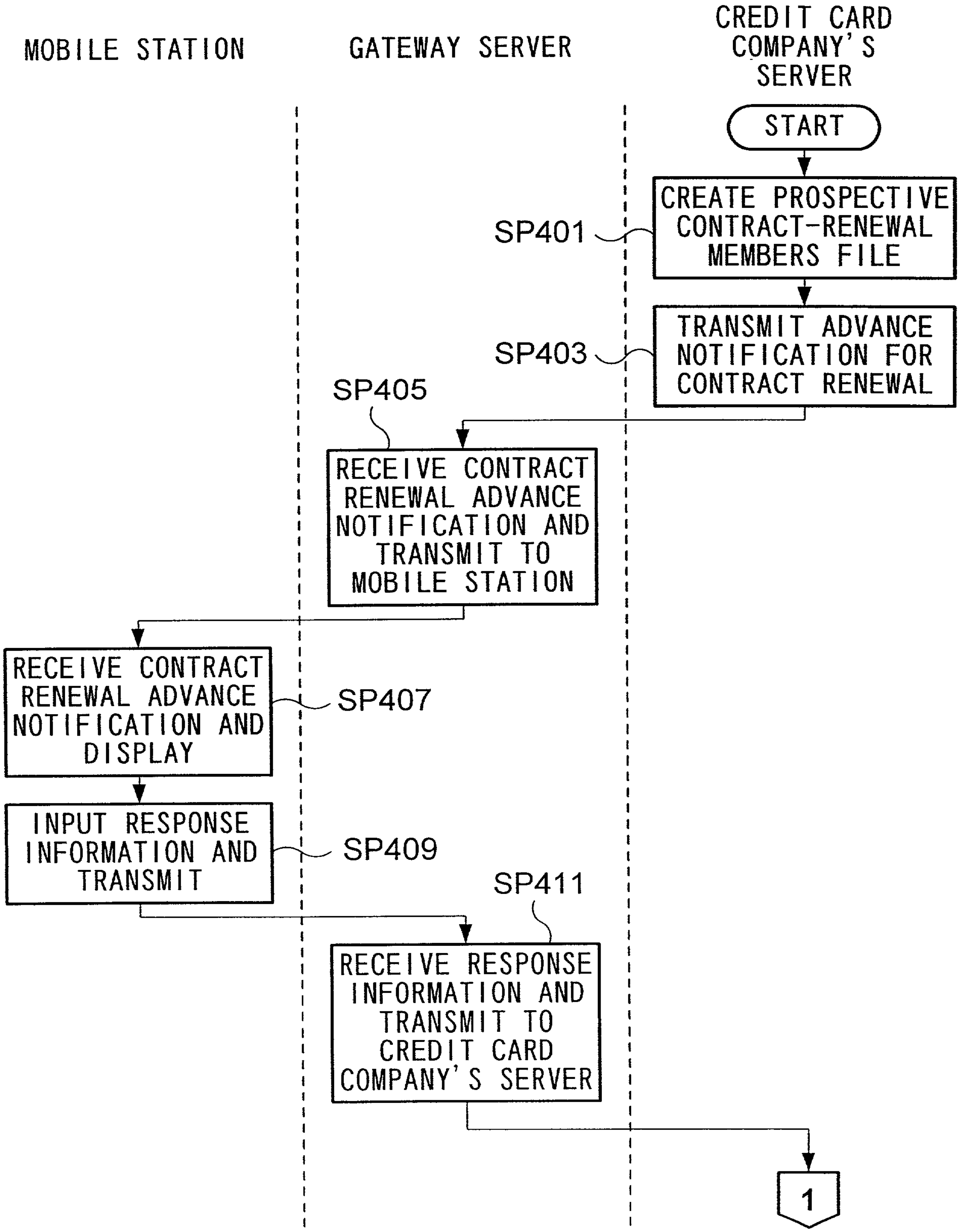
MOBILE STATION
GATEWAY SERVER
CREDIT CARD COMPANY'S SERVER
START
CREATE PROSPECTIVE CONTRACT-RENEWAL MEMBERS FILE
SP401
TRANSMIT ADVANCE NOTIFICATION FOR CONTRACT RENEWAL
SP403
SP405
RECEIVE CONTRACT RENEWAL ADVANCE NOTIFICATION AND TRANSMIT TO MOBILE STATION
RECEIVE CONTRACT RENEWAL ADVANCE NOTIFICATION AND DISPLAY
SP407
INPUT RESPONSE INFORMATION AND TRANSMIT
SP409
SP411
RECEIVE RESPONSE INFORMATION AND TRANSMIT TO CREDIT CARD COMPANY'S SERVER
1

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FIG. 16B

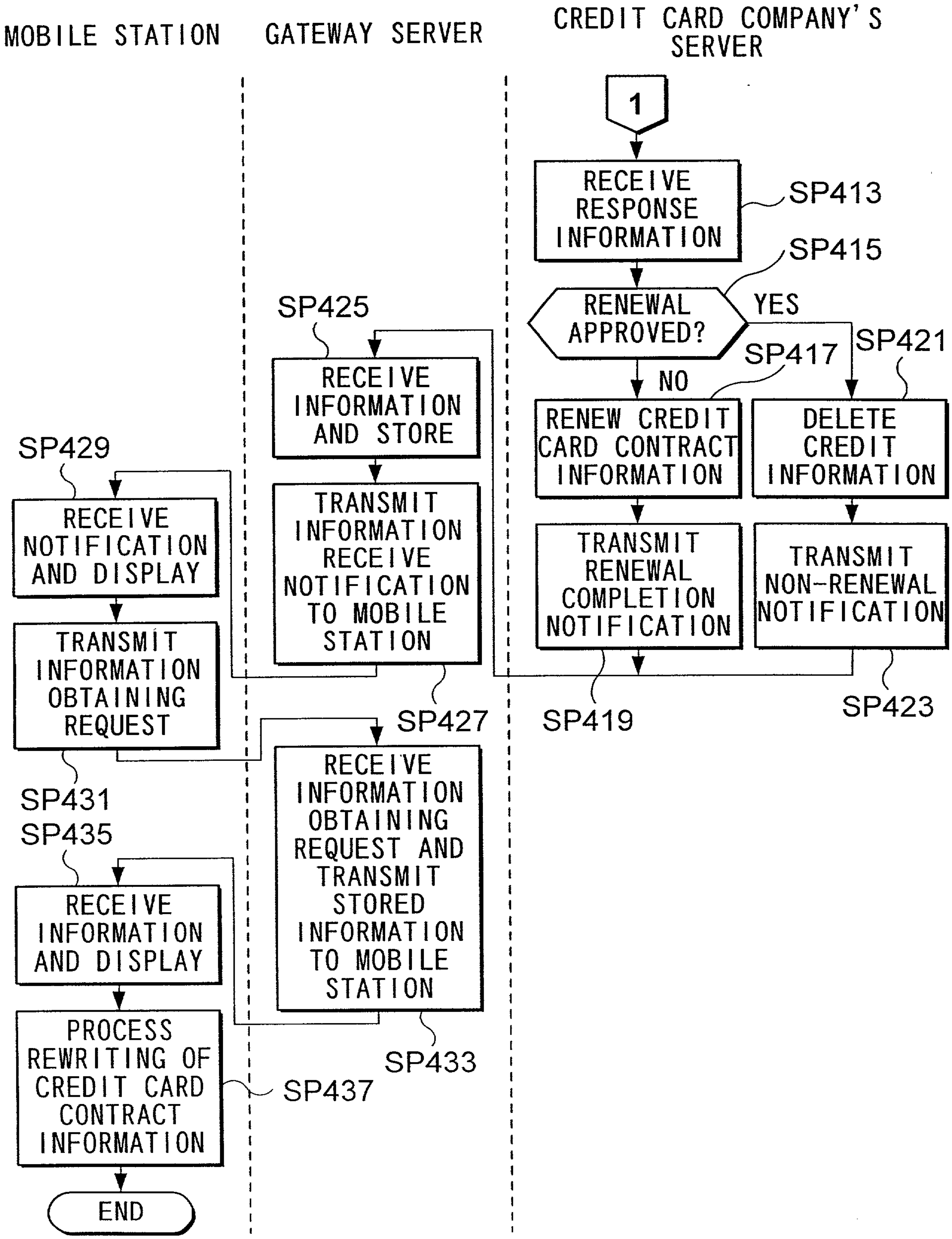
MOBILE STATION
GATEWAY SERVER
CREDIT CARD COMPANY'S SERVER
1
RECEIVE RESPONSE INFORMATION
SP413
SP415
RENEWAL APPROVED?
YES
NO
SP417
SP421
RENEW CREDIT CARD CONTRACT INFORMATION
DELETE CREDIT INFORMATION
TRANSMIT RENEWAL COMPLETION NOTIFICATION
TRANSMIT NON-RENEWAL NOTIFICATION
SP419
SP423
SP425
RECEIVE INFORMATION AND STORE
TRANSMIT INFORMATION RECEIVE NOTIFICATION TO MOBILE STATION
SP427
RECEIVE INFORMATION OBTAINING REQUEST AND TRANSMIT STORED INFORMATION TO MOBILE STATION
SP433
SP429
RECEIVE NOTIFICATION AND DISPLAY
TRANSMIT INFORMATION OBTAINING REQUEST
SP431
SP435
RECEIVE INFORMATION AND DISPLAY
PROCESS REWRITING OF CREDIT CARD CONTRACT INFORMATION
SP437
END

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FIG. 17A

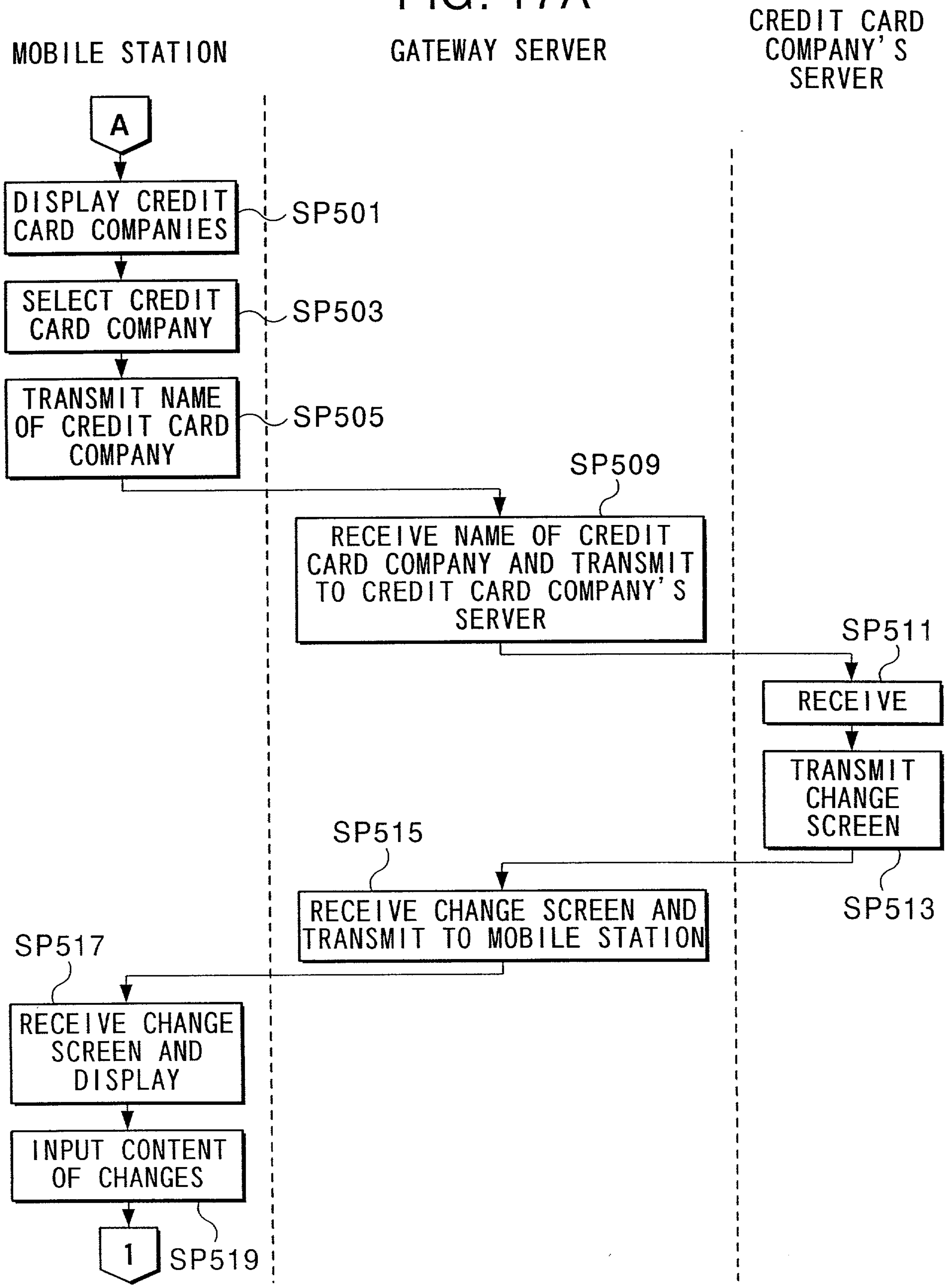
MOBILE STATION
GATEWAY SERVER
CREDIT CARD COMPANY'S SERVER
A
DISPLAY CREDIT CARD COMPANIES
SP501
SELECT CREDIT CARD COMPANY
SP503
TRANSMIT NAME OF CREDIT CARD COMPANY
SP505
SP509
RECEIVE NAME OF CREDIT CARD COMPANY AND TRANSMIT TO CREDIT CARD COMPANY'S SERVER
SP511
RECEIVE
TRANSMIT CHANGE SCREEN
SP513
SP515
RECEIVE CHANGE SCREEN AND TRANSMIT TO MOBILE STATION
SP517
RECEIVE CHANGE SCREEN AND DISPLAY
INPUT CONTENT OF CHANGES
SP519
1

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FIG. 17B

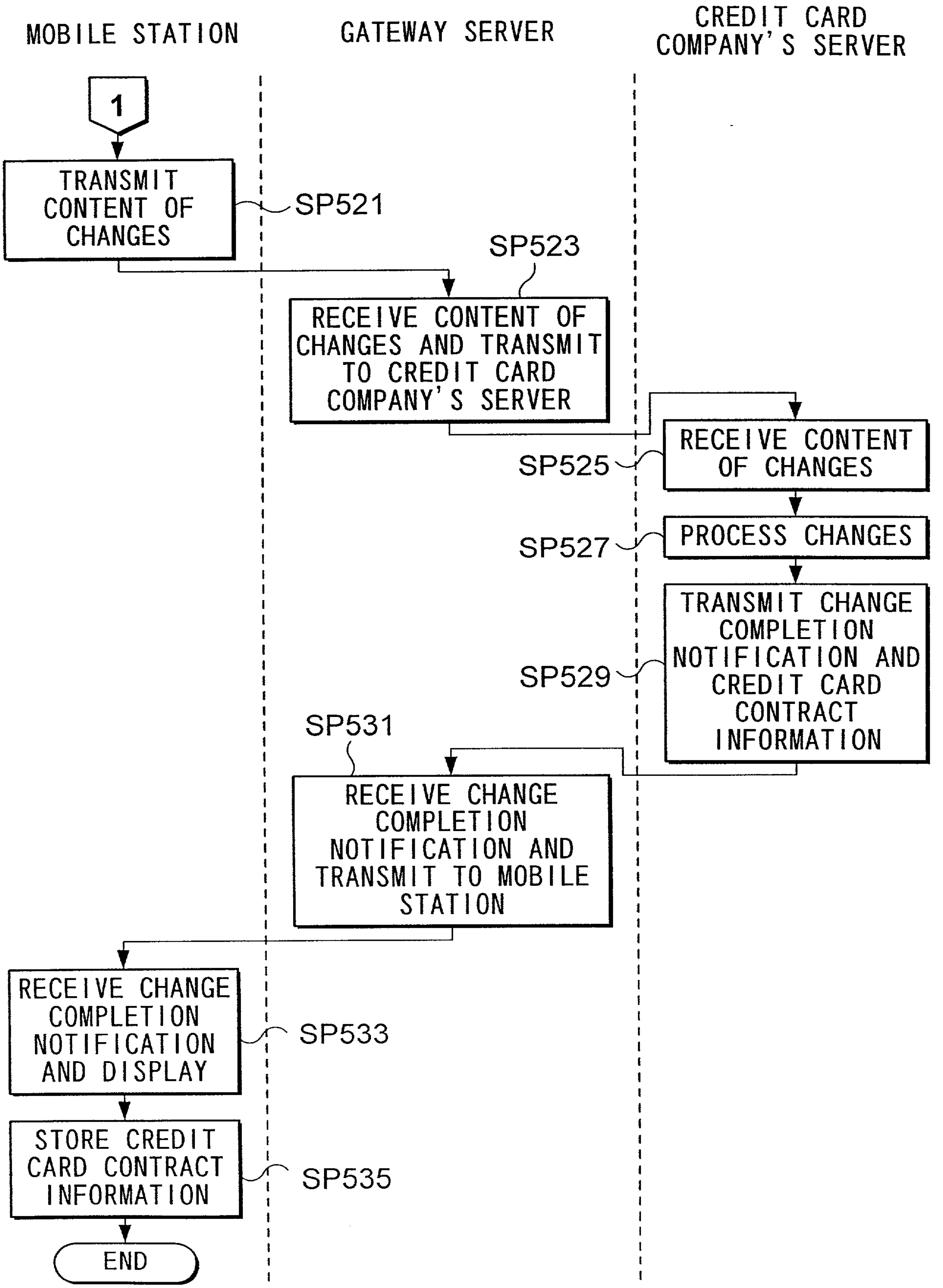
MOBILE STATION
GATEWAY SERVER
CREDIT CARD COMPANY'S SERVER
1
TRANSMIT CONTENT OF CHANGES
SP521
SP523
RECEIVE CONTENT OF CHANGES AND TRANSMIT TO CREDIT CARD COMPANY'S SERVER
RECEIVE CONTENT OF CHANGES
SP525
PROCESS CHANGES
SP527
TRANSMIT CHANGE COMPLETION NOTIFICATION AND CREDIT CARD CONTRACT INFORMATION
SP529
SP531
RECEIVE CHANGE COMPLETION NOTIFICATION AND TRANSMIT TO MOBILE STATION
RECEIVE CHANGE COMPLETION NOTIFICATION AND DISPLAY
SP533
STORE CREDIT CARD CONTRACT INFORMATION
SP535
END

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FIG. 18

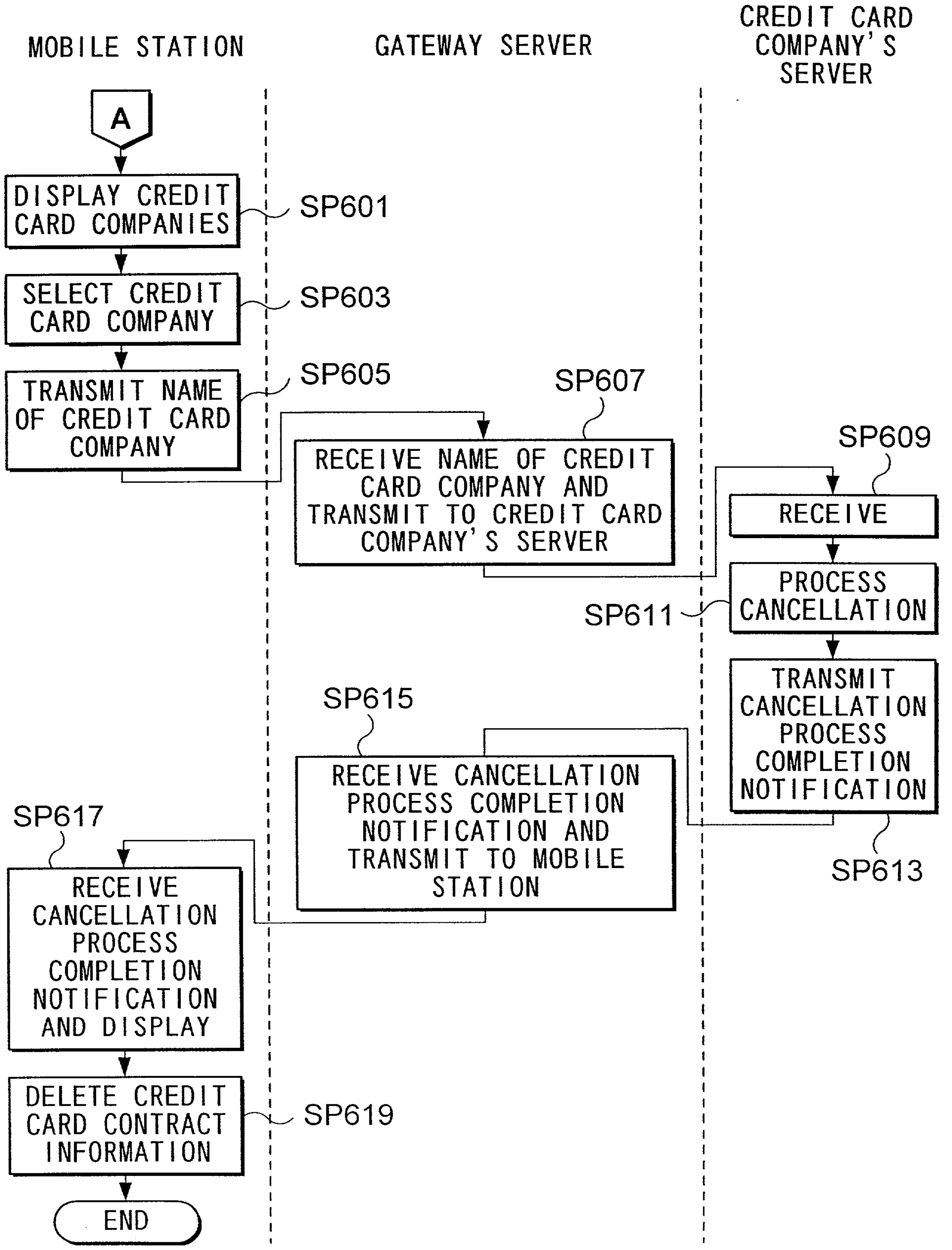
MOBILE STATION
GATEWAY SERVER
CREDIT CARD COMPANY'S SERVER
A
DISPLAY CREDIT CARD COMPANIES
SP601
SELECT CREDIT CARD COMPANY
SP603
TRANSMIT NAME OF CREDIT CARD COMPANY
SP605
SP607
RECEIVE NAME OF CREDIT CARD COMPANY AND TRANSMIT TO CREDIT CARD COMPANY'S SERVER
SP609
RECEIVE
PROCESS CANCELLATION
SP611
TRANSMIT CANCELLATION PROCESS COMPLETION NOTIFICATION
SP613
SP615
RECEIVE CANCELLATION PROCESS COMPLETION NOTIFICATION AND TRANSMIT TO MOBILE STATION
SP617
RECEIVE CANCELLATION PROCESS COMPLETION NOTIFICATION AND DISPLAY
DELETE CREDIT CARD CONTRACT INFORMATION
SP619
END

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FIG. 19

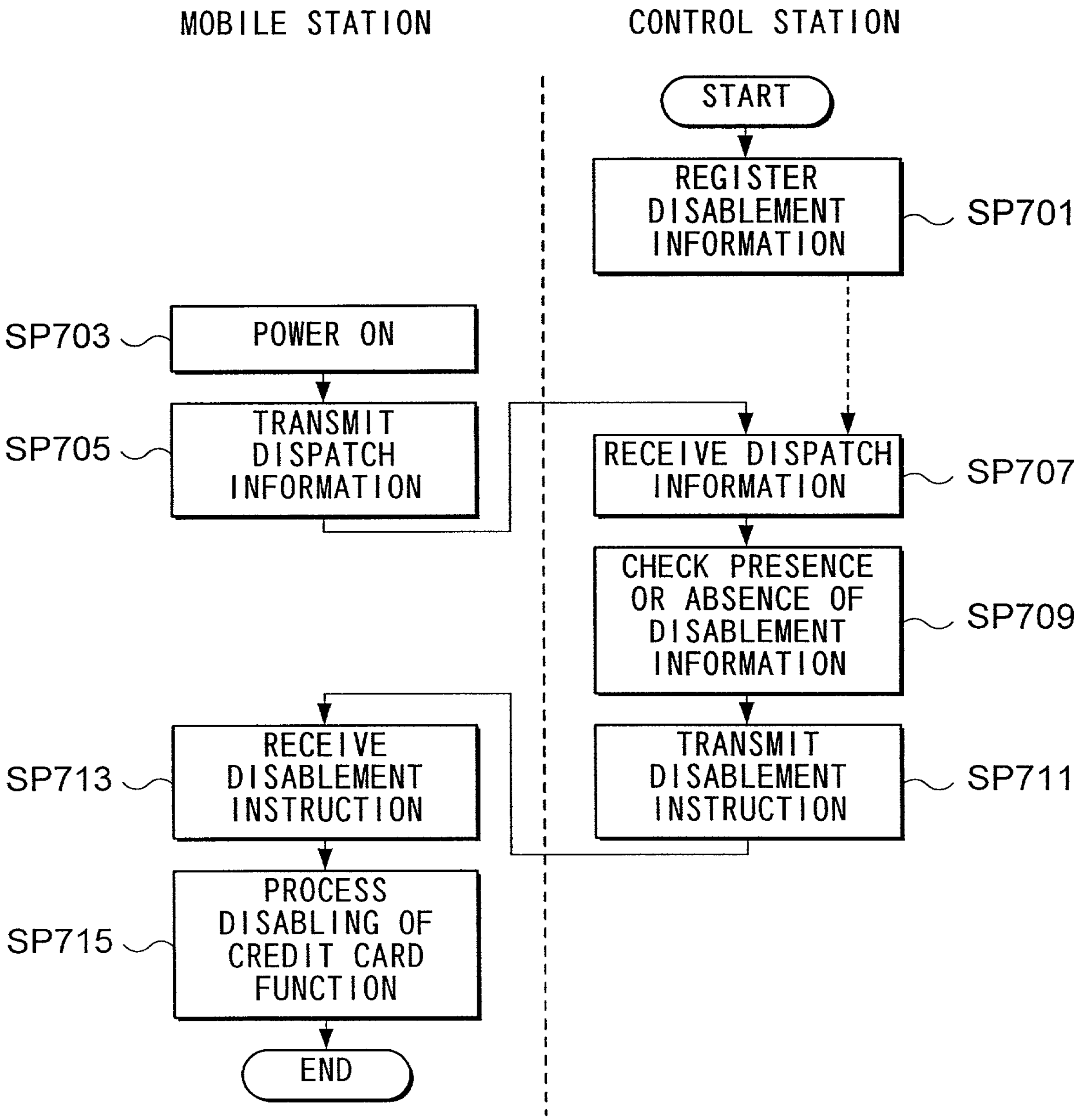
MOBILE STATION
CONTROL STATION
START
REGISTER DISABLEMENT INFORMATION
SP701
POWER ON
SP703
TRANSMIT DISPATCH INFORMATION
SP705
RECEIVE DISPATCH INFORMATION
SP707
CHECK PRESENCE OR ABSENCE OF DISABLEMENT INFORMATION
SP709
TRANSMIT DISABLEMENT INSTRUCTION
SP711
RECEIVE DISABLEMENT INSTRUCTION
SP713
PROCESS DISABLING OF CREDIT CARD FUNCTION
SP715
END

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FIG. 20

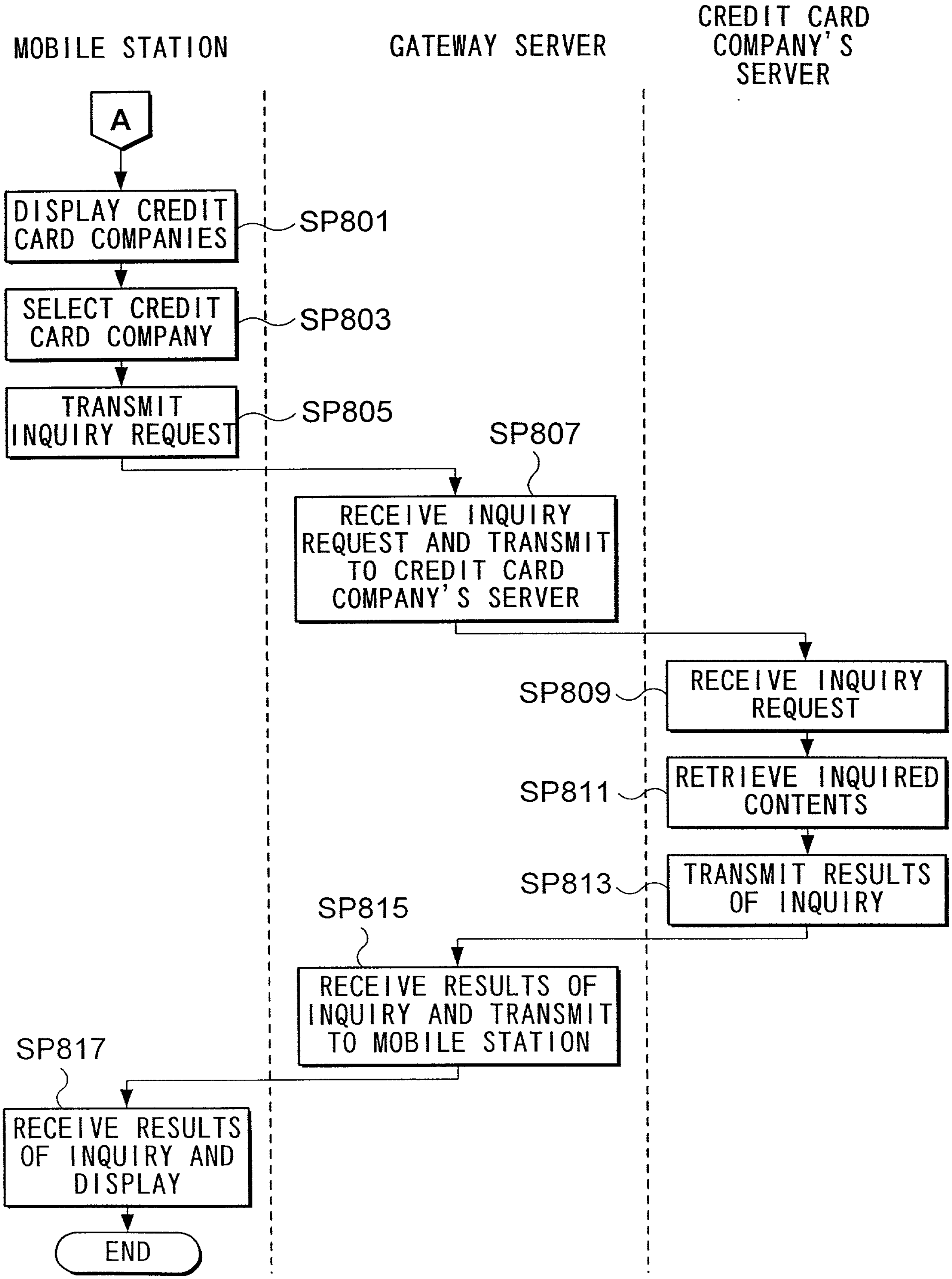
MOBILE STATION
GATEWAY SERVER
CREDIT CARD COMPANY'S SERVER
A
DISPLAY CREDIT CARD COMPANIES
SP801
SELECT CREDIT CARD COMPANY
SP803
TRANSMIT INQUIRY REQUEST
SP805
SP807
RECEIVE INQUIRY REQUEST AND TRANSMIT TO CREDIT CARD COMPANY'S SERVER
SP809
RECEIVE INQUIRY REQUEST
SP811
RETRIEVE INQUIRED CONTENTS
SP813
TRANSMIT RESULTS OF INQUIRY
SP815
RECEIVE RESULTS OF INQUIRY AND TRANSMIT TO MOBILE STATION
SP817
RECEIVE RESULTS OF INQUIRY AND DISPLAY
END

FIG. 21

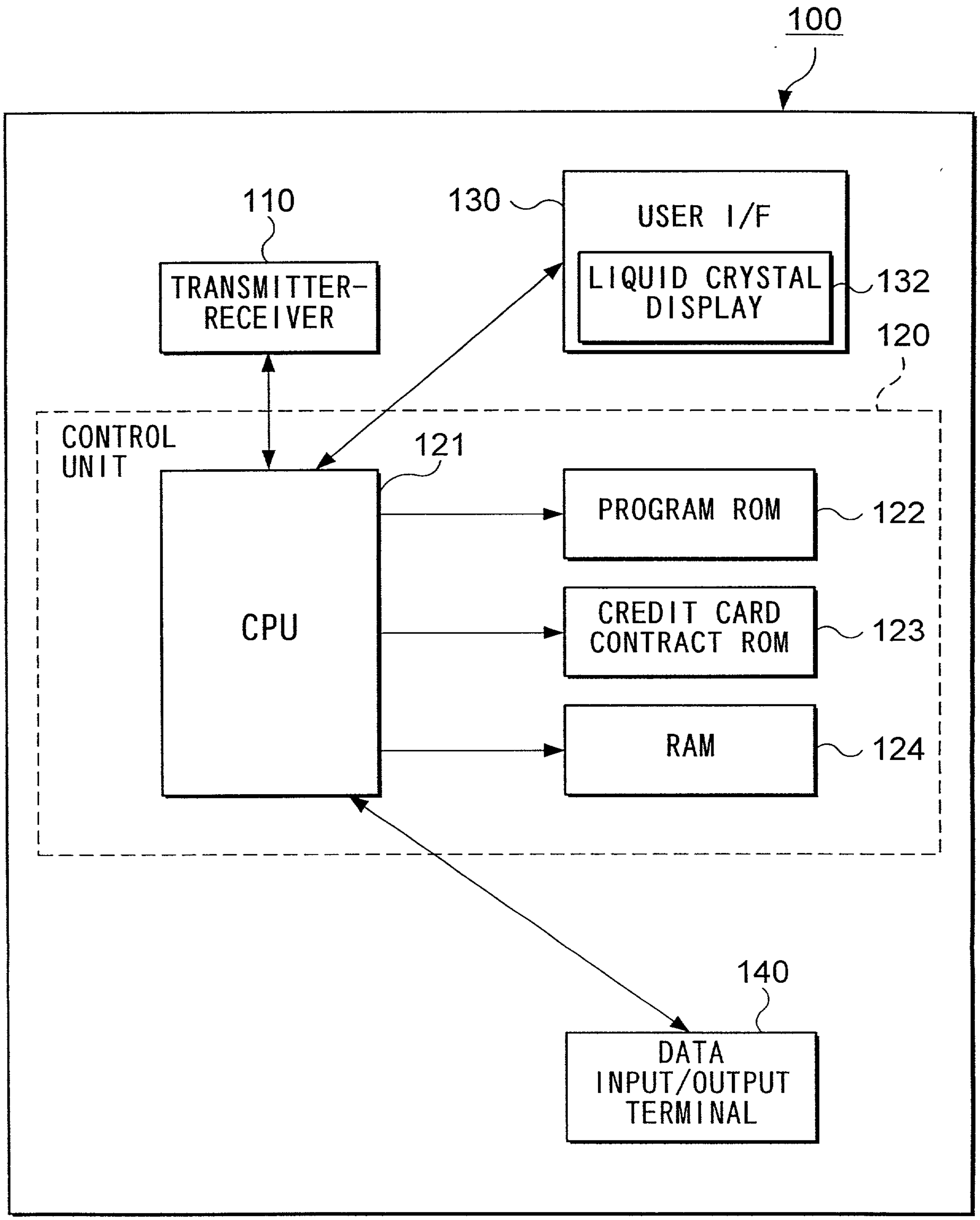
100
110
TRANSMITTER-RECEIVER
130
USER I/F
LIQUID CRYSTAL DISPLAY
132
120
CONTROL UNIT
121
CPU
PROGRAM ROM
122
CREDIT CARD CONTRACT ROM
123
RAM
124
140
DATA INPUT/OUTPUT TERMINAL

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FIG. 22

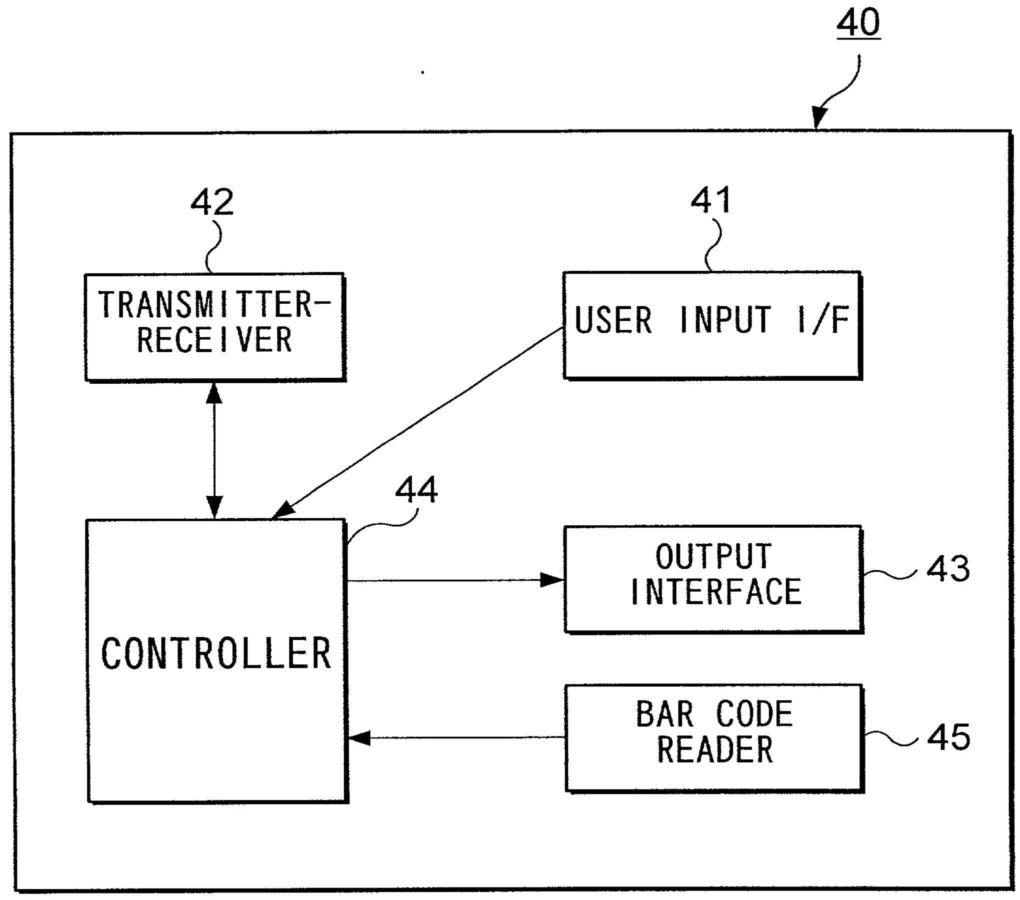
40
42
TRANSMITTER-RECEIVER
41
USER INPUT I/F
44
CONTROLLER
OUTPUT INTERFACE
43
BAR CODE READER
45

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FIG. 23

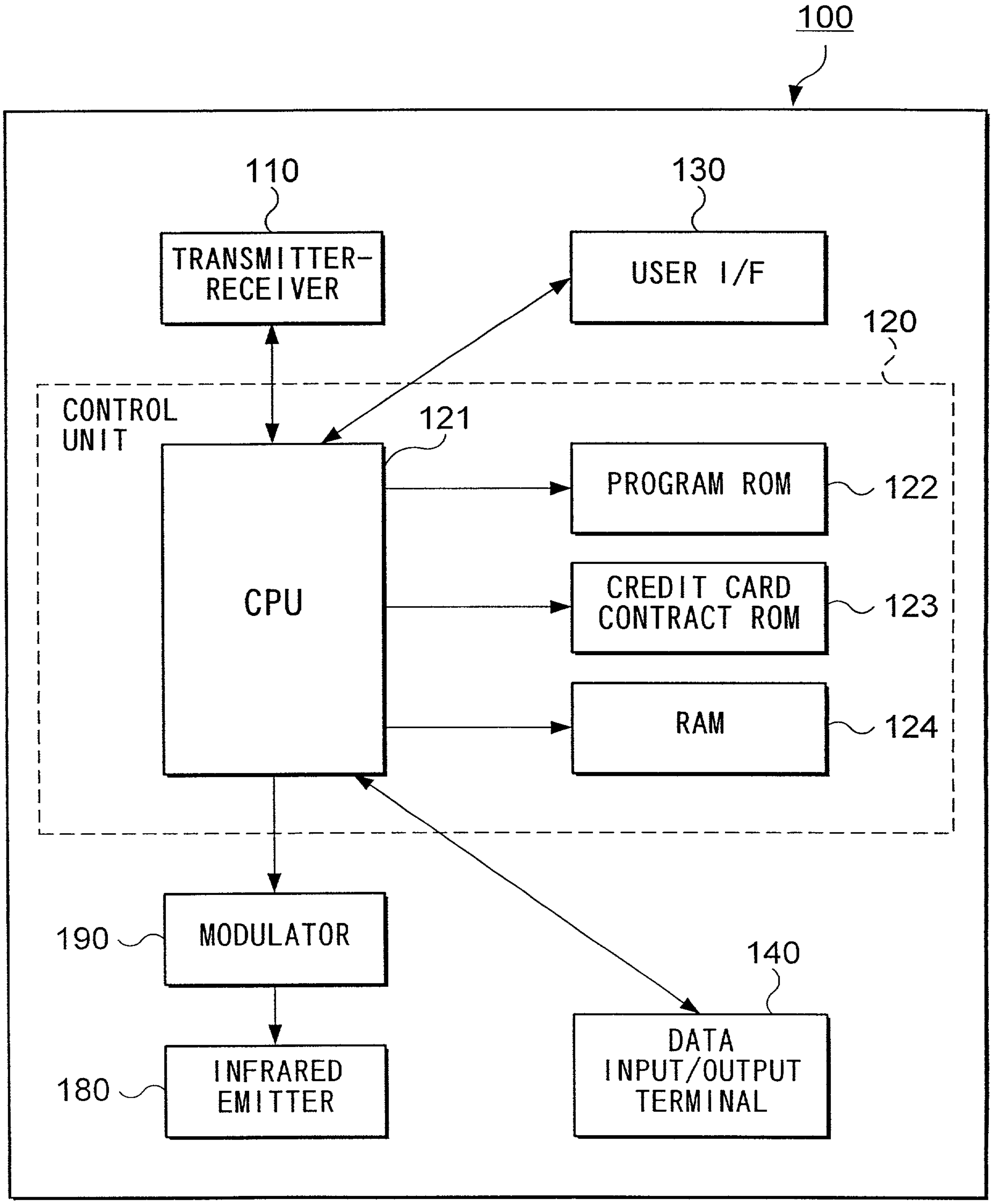
100
110
TRANSMITTER-RECEIVER
130
USER I/F
120
CONTROL UNIT
121
CPU
PROGRAM ROM
122
CREDIT CARD CONTRACT ROM
123
RAM
124
190
MODULATOR
180
INFRARED EMITTER
140
DATA INPUT/OUTPUT TERMINAL

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FIG. 24

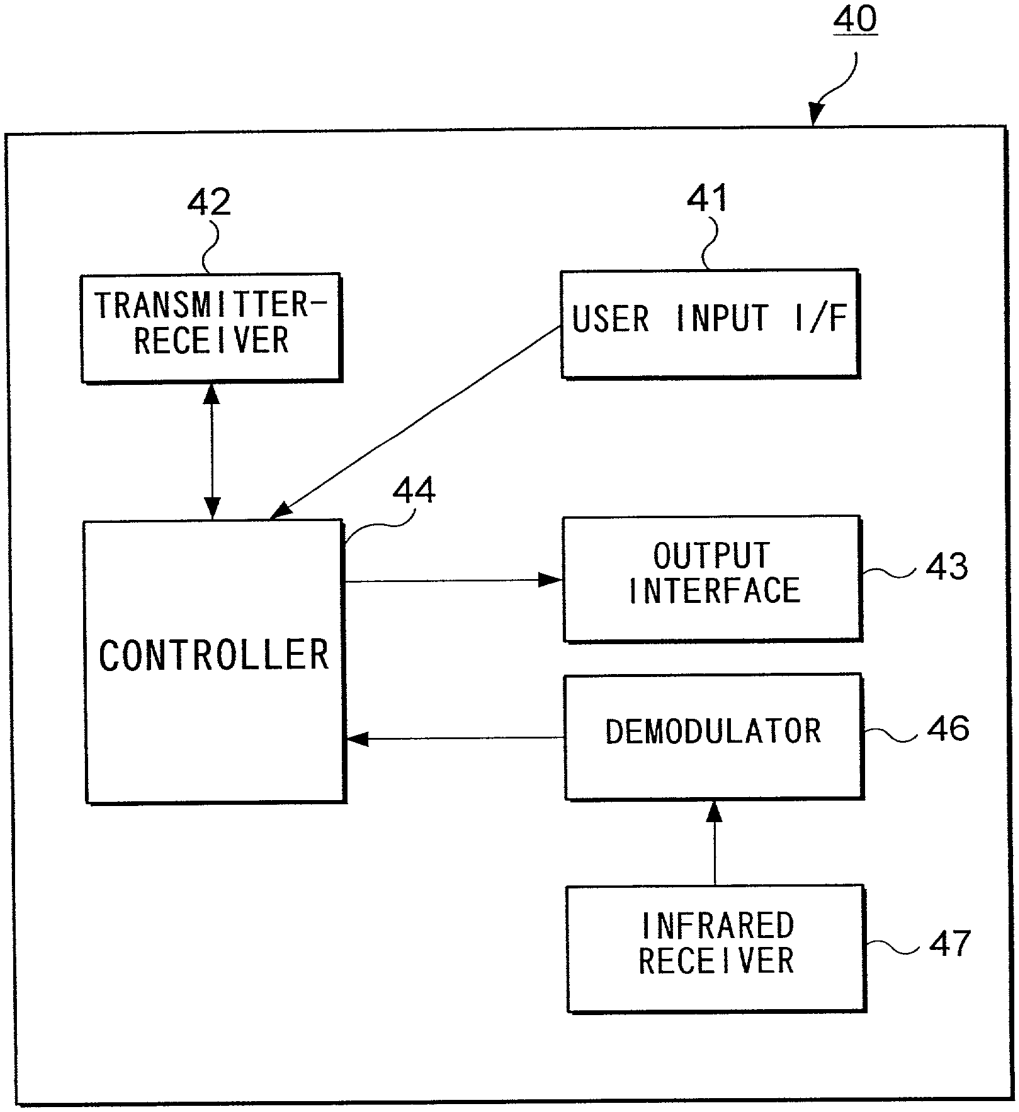
40
42
TRANSMITTER-RECEIVER
41
USER INPUT I/F
44
CONTROLLER
OUTPUT INTERFACE
43
DEMODULATOR
46
INFRARED RECEIVER
47

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FIG. 25

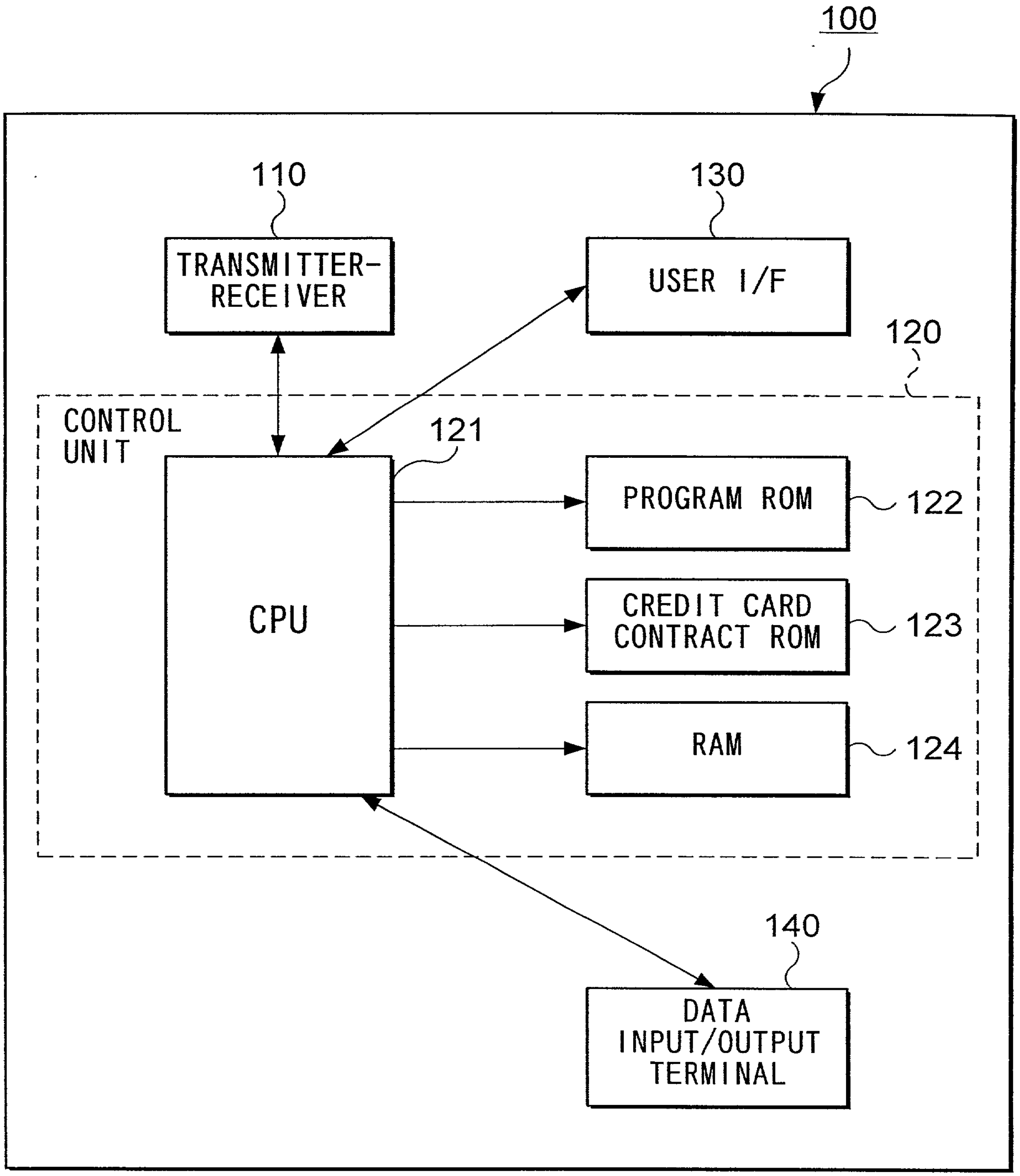
100
110
TRANSMITTER-RECEIVER
130
USER I/F
120
CONTROL UNIT
121
CPU
PROGRAM ROM
122
CREDIT CARD CONTRACT ROM
123
RAM
124
140
DATA INPUT/OUTPUT TERMINAL

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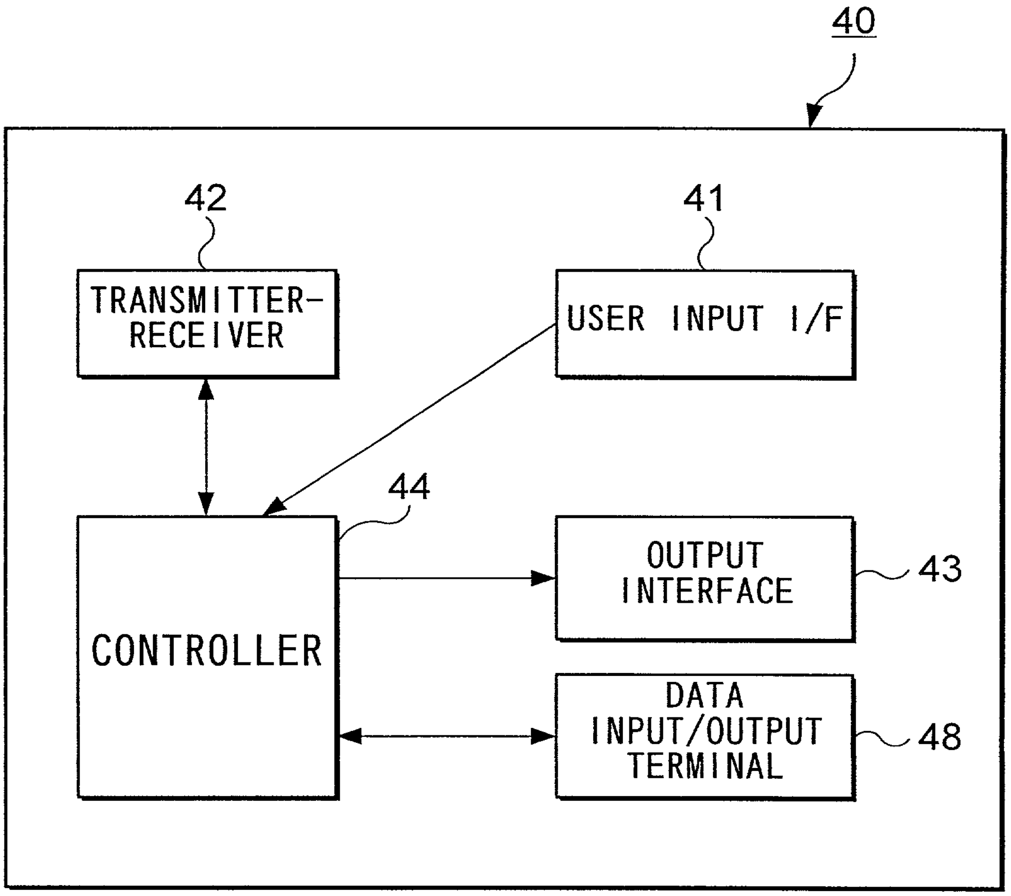
FIG. 26


40
42
41
TRANSMITTER-RECEIVER
USER INPUT I/F
44
CONTROLLER
OUTPUT INTERFACE
43
DATA INPUT/OUTPUT TERMINAL
48

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JC03 Rec'd PCT/PTC 02 AUG 2001

Japanese Patent Application,
Laid-Open Publication No. H11-18158

[Title of the Invention] Portable terminal equipment

[Abstract]

[Problem] To provide value information easily to a portable terminal which uses a battery as a power source and deducts the amount of payment from the value information provided in advance.

[Means for Solving the Problem] A memory 43 which stores value information and a CPU 42 which reads the value information from and writes the value information to the memory are provided on an IC card 4, and a reading unit 37 which reads the value information stored in the card 4 and a communication interface 33 for transmitting the value information to the portable terminal 1 are provided in a charger 3. When the IC card is inserted into the charger at the time of charging the portable terminal, the reading unit 37 reads the value information stored in the memory 43 via the CPU 42, transmits it to the portable terminal via the communication interface and stores it in the memory 16 of the portable terminal.

[Claims]

[Claim 1] Portable terminal equipment comprising a portable terminal using a battery as a power source and a charger for charging the battery, wherein a card having settlement-related information stored therein is provided and a reading unit which reads the settlement-related information in the card and provides the information to the portable terminal is provided in the charger.

[Claim 2] The portable terminal equipment of claim 1, wherein the card is a contact-type IC card which has a memory which stores at least the settlement-related information and is connected to the reading unit via contacts.

[Claim 3] The portable terminal equipment of claim 1, wherein the card is a non-contact-type IC card which has a memory which stores at least the settlement-related information and is connected to the reading unit in a non-contact manner.

[Claim 4] The portable terminal equipment of claim 1, wherein the card is a magnetic card having the settlement-related information magnetically recorded thereon, and the reading unit comprises a magnetic card reading and writing unit which reproduces and records the settlement-related information of the magnetic card.

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[Claim 5] The portable terminal equipment of claim 1, wherein the card is an optical card having the settlement-related information photomagnetically recorded thereon, and the reading unit comprises an optical card reading and writing unit which reproduces and records the settlement-related information of the optical card.

[Claim 6] The portable terminal equipment of claim 1, wherein the settlement-related information is value information provided in the card in advance.

[Claim 7] The portable terminal equipment of claim 1, wherein the settlement-related information is a unique card identification number provided in the card in advance.

[Claim 8] The portable terminal equipment of claim 1, wherein the card is a credit card and the settlement-related information is the identification number of the card.

[Claim 9] The portable terminal equipment of claim 6, wherein the reading unit rewrites the value information in the card after providing the value information to the portable terminal.

[Claim 10] The portable terminal equipment of any of claims 1 to 9, wherein a wire communication interface, a radio communication interface or an infrared communication interface is provided between the reading unit and the portable terminal, and the reading unit transmits the settlement-related information to the portable terminal via the communication interface to store the information in the memory of the portable terminal.

[Claim 11] The portable terminal equipment of any of claims 1 to 10, wherein the portable terminal is used at the time of carrying out communication or purchasing a commodity from a vending machine.

[Detailed Description of the Invention]

[0001]

[Field of the Invention]

The present invention relates to portable terminal equipment which is capable of purchasing a commodity from a vending machine by radio and carrying out voice and data communications.

[0002]

[Prior Art]

In recent years, a portable terminal has been proposed which is capable of purchasing a desired commodity from a vending machine by exchanging, for example, infrared signals (light signals) with the vending machine. This portable terminal stores value information in advance and transmits the balance information stored in advance to a vending machine at the time of purchasing a commodity. Then, the vending machine lights the commodity lamps corresponding to the commodities carried in stock when the received balance is higher than or equal to a given amount of money.

[0003]

At this point, when one of the commodity buttons corresponding to the lit commodity lamps of the vending machine is pressed, the vending machine

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subtracts the price of the selected commodity from the balance stored in the portable terminal and then ejects the commodity. In addition, the portable terminal is also capable of communicating with the nearest radio base station by radio and therefore has the function of carrying out voice and data communications with the receiving person.

[0004]

[Problems to be Solved by the Invention]

Such a portable terminal has excellent convenience since it is capable of purchasing a commodity from a vending machine without using coins and bills and carrying out voice and data communications. However, when value information is to be stored in such a portable terminal, the portable terminal requires a special interface. Therefore, it has the problem that the value information cannot be provided to the portable terminal easily because the size and cost of portable terminal increase due to the special interface. It is therefore the object of the present invention to provide the value information to the portable terminal by a simple configuration.

[0005]

[Means for Solving the Problems]

To solve the above problem, according to the present invention, portable terminal equipment is provided which comprises a portable terminal using a battery as a power source and a charger for charging the battery, wherein a card having settlement-related information stored therein is provided and a reading unit which reads the settlement-related information in the card and provides the information to the portable terminal is provided in the charger. Further, the card may be a contact-type IC card which has a memory which stores at least the settlement-related information and be connected to the reading unit via contacts. Further, the card may be a non-contact-type IC card which has a memory which stores at least the settlement-related information and be connected to the reading unit in a non-contact manner. Further, the card may be a magnetic card having the settlement-related information magnetically recorded thereon, and the reading unit may comprise a magnetic card reading and writing unit which reproduces and records the settlement-related information stored in the magnetic card. Further, the card may be an optical card having the settlement-related information photomagnetically recorded thereon, and the reading unit may comprise an optical card reading and writing unit which reproduces and records the settlement-related information stored in the optical card.

[0006]

Further, the settlement-related information is the value information provided in the card in advance. Further, the settlement-related information may also be the unique card identification number provided in the card in advance. Further, the settlement-related information may also be the identification number of a credit card. Further, the reading unit rewrites the value information in the card after providing the value information to the portable terminal. Further, a wire communication interface, a radio communication interface or an infrared communication interface is provided between the reading unit and the portable terminal, and the reading unit transmits the settlement-related information to the portable terminal via the communication interface to store the information in the memory of the portable terminal. Further, the portable terminal is used at the time of carrying out communication or purchasing a commodity from a vending machine.

[0007]

[Description of the Preferred Embodiment]

The present invention will be described with reference to drawings hereinafter. Fig. 1 is a block diagram showing one embodiment of the portable terminal equipment according to the present invention and shows the configuration of a portable terminal 1 constituting the portable terminal equipment. In Fig. 1, reference numeral 11 denotes a communication unit comprising a radio unit 11A, a communication circuit 11B and a CPU 11C; 12 an operation unit such as a keyboard; 13 a battery which supplies power to the communication unit 11 and the like; 14 a light receiving unit which receives an infrared signal from a vending machine which is not shown; 15 a light transmitting unit which transmits an infrared signal to the vending machine; 16 a memory; 17 a control unit which controls the respective portions; 18 a switch which supplies power from the battery 13 to the light transmitting unit 15, control unit 17 and the like based on the signal received by the light receiving unit 14; 19 a latch circuit which closes the switch 18 by receiving the output of the light receiving unit 14 and opens the switch 18 by the output of the control unit 17; 21 and 22 charging terminals to be connected to the charging terminals of a charger to be described later at the time of charging the battery 13; 23 a signal terminal to be connected to the signal terminal of a charger to be described later; and 24 a charging detector which detects the charge of the battery 13.

[0008]

Next, a description will be given to the operation of the thus-configured portable terminal. When a user carrying the portable terminal approaches a vending machine, while using the light receiving unit 14 which constantly receives power from the battery 13, the portable terminal receives the polling signals transmitted at regular intervals by infrared radiation from the vending machine. Then, the portable terminal transmits the received signal to the latch circuit 19 which also constantly receives power from the battery 13 to close the switch 18. Then, the power of the battery 13 is supplied to the control unit 17 and the light transmitting unit 15 via the switch 18.

[0009]

The power-supplied and activated control unit 17 transmits an infrared signal from the activated light transmitting unit 15 to establish an information link with the vending machine. Thereafter, the control unit 17 transmits an acknowledgment signal to the vending machine by infrared radiation. Then, when the vending machine transmits a balance inquiry as an infrared signal, the control unit 17 receives the signal via the light receiving unit 14 and transmits the balance information stored in the memory 16 to the vending machine via the light transmitting unit 15 as an infrared signal.

[0010]

By receiving such balance information, the vending machine lights the commodity lamps corresponding to the commodities carried in stock. At this point, when the user presses a desired commodity selection switch of the vending machine, the vending machine transmits the price of the selected commodity to the portable terminal as an infrared signal. When the control unit 17 of the portable terminal receives the signal via the light receiving unit 14, it subtracts the price of the commodity from the balance information stored in the memory 16 and then transmits a signal notifying that the price of the commodity has been subtracted from the balance to the vending machine by infrared radiation. When the vending machine receives the signal, it ejects the selected commodity to the user. Thereafter, when a certain amount of time elapses with the user making no additional purchases, the control unit 17 activates the latch circuit 19 to open the switch 18. As a result, the power supply from the battery 13 to the control unit 17 and the like is stopped. The value information stored in the memory 16 is constantly backed up by the power supplied from the battery 13 via a resistor which is not shown.

[0011]

Next, a description will be given to the operation of making a call by the portable terminal in the present invention via the communication unit 11. When a switch, not shown, in the operation unit 12 is pressed down, power is supplied from the battery 13 to activate the CPU 11C in the communication unit 11. The activated CPU 11C detects which dial keys in the operation unit 12 are pressed down and then transmits the operation information as a radio signal to a base station which is not shown via the radio unit 11A and the antenna AT. Thereby, the receiving person corresponding to the dialed number is called, and when the receiving person answers the call, the voice communication by the user via the communication circuit 11B starts.

[0012]

In this case, the CPU 11C in the communication unit 11 actives the latch circuit 19 to close the switch 18, whereby power is supplied from the battery 13 to the control unit 17 to activate it. Then, the CPU 11C sends the information notifying that transmission is to be made together with the telephone number of the receiving person. The control unit 17 checks the amount of the balance stored in the memory 16. When the balance is zero, the control unit 17 controls the CPU 11C to stop the transmission and activates the latch circuit 19 to stop the supply of power from the battery 13. On the other hand, when the balance stored in the memory 16 is not zero, the control unit 17 permits the transmission and, when notified by the CPU 11C that the receiving person answered the call, initiates autonomous charging based on the telephone number of the receiving person. Further, when the portable terminal receives a billing signal from an exchange via a base station while the call is in progress, the control unit 17 subtracts a unit call charge from the balance stored in the memory 16 based on the information provided by the CPU 11C each time the billing signal arrives.

[0013]

Then, when notified by the CPU 11C that the call ended, the control unit 17 activates the latch circuit 19 to stop the supply of power from the battery 13 to the control unit 17. Further, when the balance stored in the memory 16 reaches 0 while the call is still in progress, the control unit 17 sets the value information in the memory 16 to be "zero" and then controls the CPU 11C to terminate the call. Thereafter, the control unit 17 stops the power supply to itself. Although the above example is about carrying out a voice communication with a receiving person, even when the telephone number of a receiving person is transmitted by the portable terminal 1 to carry out a data communication with the receiving person via the communication circuit 11B of the communication unit 11, the communication charge is also paid from the value information provided in the memory 16 in advance.

[0014]

Further, by storing the identification number of the card purchased by the user in the memory 16 of the portable terminal 1 in advance in place of the above value information, payment can be made based on the identification number for the communication charge made by the data communication using the portable terminal 1. That is, the identification number of the purchased card is stored not only in the memory 16 of the portable terminal 1 but also in the memory of an exchange which is not shown. The memory of the exchange also stores the value information corresponding to the identification number.

[0015]

When the portable terminal 1 makes a call, it transmits the card identification number stored in the memory 16 to the exchange via a base station. Then, the exchange searches its own memory for the received identification number, and when the received identification number is found in the memory of the exchange, the exchange permits transmission and calls the receiving person. When the receiving person answers the call to establish communication with the portable terminal 1, the exchanges starts to charge for the communication and subtracts the charge from the value information in the memory which corresponds to the identification number transmitted from the portable terminal 1. When the value information reaches zero, the exchange terminates the communication between the receiving person and the portable terminal 1 and removes the identification number of the card from the memory.

[0016]

As described above, by keeping and managing the value information of a card (prepaid card) at the exchange, an unauthorized communication by use of a forged card can be prevented reliably. Further, it is also possible to store the identification number of a credit card belonging to the user in the memory of the portable terminal 1 in place of the identification number of the above prepaid card. In this case, the identification number of the credit card is stored in the exchange in advance. When the exchange receives a credit card identification number from the portable terminal 1 at the time of transmission, the exchange searches its own memory for the received credit card identification number, and when the received identification number is found in the memory of the exchange, the exchange permits the transmission and calls the receiving person to establish communication between the portable terminal 1 and the receiving person. The exchanges starts to charge for the communication and stores the communication charge in the memory area corresponding to the credit card identification number. This communication charge is withdrawn from the bank account of the user at the end of the month, for example.

[0017]

As described above, the portable terminal 1 using the battery 13 as a power source in the present invention can be used for making a call, carrying out data communication and purchasing a commodity from a vending machine, and the communication charge and the payment for the commodity purchased from the vending machine are paid from the value information stored in the memory 16 in advance. Alternatively, the payment can be made based on the identification number of a card purchased by the user or a credit card belonging to the user which is stored in the memory 16 in advance. In addition, when the battery becomes weak, it is charged by the charger as described above.

[0018]

Fig. 3 is a diagram showing the charging state of the portable terminal. In Fig. 3(a), reference numeral 1 denotes a portable terminal and 3 a charger. When the portable terminal 1 is charged by the charger 3, by inserting an IC card 4 having the value information stored therein into the card insertion slot 3A of the charger 3 as shown in Fig. 3(a), the value information in the inserted IC card 4 is stored in the memory 16 of the portable terminal 1 via the charger 3. Then, after the contents of the memory 16 are overwritten by the value information in the IC card 4, the value information in the IC card 4 is rewritten.

[0019]

Thus, by paying attention to the facts that the portable terminal of this type is frequently charged and that the portable terminal cannot be used during charge, the present invention employs a scheme in which the contents of the memory of the portable terminal are overwritten by the value information stored in the inserted IC card during charging the portable terminal. Fig. 3(b) is a diagram showing the structure of a SIM (Subscriber Identification Module) 41 which is provided in the IC card 4 for storing the value information. An SIM 41 comprises a CPU 42 and a memory 43, and value information is provided in the memory 43 in advance. The user of the portable terminal can use the portable terminal, in place of coins and bills, for a variety of applications such as making a phone call and purchasing a commodity from a vending machine by purchasing the IC card 4 having predetermined value information provided therein and transferring the value information to the portable terminal via the charger 3.

[0020]

Fig. 2 is a diagram showing the structures of the charger and the IC card which constitute portable terminal equipment. The charger 3 shown in Fig. 2(a) comprises a charging circuit 31 which converts the voltage supplied from an AC power source 5 into a predetermined direct current voltage and outputs the direct current voltage from charging terminals 34 and 35, a power circuit 32 which converts the voltage supplied from the AC power source 5 into a direct current voltage, a reading unit 37 which receives the direct current voltage from the power circuit 32 and reads value information from the IC card 4, and a communication interface 33 which transmits the value information read by the reading unit 37 to the portable terminal via a signal terminal 36.

[0021]

Meanwhile, a contact unit 44 comprising a plurality of contacts is provided in the IC card 4 as shown in Fig. 2(b). When the IC card 4 is inserted into the card insertion slot 3A of the charger 3, the contact unit 44 of the card 4 makes contact with the reading unit 37 of the charger 3. Then, the reading unit 37 of the charger 3 reads the value information stored in the memory 43 of the IC card 4 via the CPU 42 and contact unit 44 of the card 4. Then, the value information read from the IC card by the reading unit 37 is sent to the portable terminal 1 via the communication interface 33 and stored in the memory 16 of the portable terminal 1. Thus, the value information in the portable terminal is rewritten.

[0022]

Next, a more detailed description will be given to the operation at the time of charging the portable terminal 1. When the portable terminal 1 is charged by the charger 3, they are connected to each other in the following manner. That is, the charging terminals 21 and 22 of the portable terminal 1 are connected to the charging terminal 34 and 35 of the charger 3, respectively, and the signal terminal 23 of the portable terminal 1 is connected to the signal terminal 36 of the charger 3. Then, the battery 13 of the portable terminal 1 is charged by applying a predetermined direct current voltage from the charging circuit 31 of the charger 3 to the battery 13 via the charging terminals 21 and 34 and 22 and 35.

[0023]

At this point, the charging detector 24 of the portable terminal 1 shown in Fig. 1 activates the latch circuit 19 to close the switch 18 when the charging voltage applied to the battery 13 reaches a predetermined level. Thereby, the control unit 17 of the portable terminal 1 is activated. When the IC card 4 is already inserted into the charger 3 at this point, the reading unit 37 of the charger 3 directs the CPU 42 of the IC card 4 via the contact unit 44 to read the value information stored in the IC card 4. Then, the CPU 42 reads the value information stored in the memory 43 in advance. When the reading unit 37 of the charger 3 receives the value information retrieved by the CPU 42 via the contact unit 44, it transmits the value information to the control unit 17 via the communication interface 33 and the signal terminals 36 and 23. The activated control unit 17 receives the value information of the IC card 4 which has been transmitted from the reading unit 37 and stores in the memory 16.

[0024]

Further, in this case, the control unit 17 issues a command to rewrite the value information to the reading unit 37 of the charger 3 via the signal terminals 23 and 36 and the communication interface 33. Then, the reading unit 37 sends the rewrite command to the CPU 42 of the card 4 via the interface 44 to cause the CPU 42 to rewrite the value information stored in the memory 43. Thereafter, the control unit 17 activates the latch circuit 19 to open the switch 18, thereby stopping the power supply to the control unit 17. Thus, the value information is stored with the IC card 4 inserted in the charger 3 while the portable terminal 1 is charged by the charger 3. As a result, the value information can be provided to the portable terminal with ease and reliably.

[0025]

In the above embodiment, the CPU 42 provided on the IC card 4 reads the value information stored in the memory 43 and outputs it to the reading unit 37 of the charger 3. However , the above embodiment may be modified in such a manner that only the memory 43 is provided in the IC card 4 with the CPU 42 removed, and an unillustrated CPU provided in the reading unit 37 is caused to read the contents of the memory 43 directly via the contact unit 44. Further, it is also possible that instead of the value information of the IC card 4, only the identification number of the card 4 is read and stored in the memory 16 of the portable terminal 1 as described above and the value information of the card 4 is managed by the exchange at the time of voice communication or data communication by the portable terminal 1.

[0026]

Further, other than the interface (non-contact-type interface) which connects the charger 3 and the portable terminal 1 to each other by wires as in the present embodiment, the communication interface 33 of the charger 3 may be an infrared interface which enables the charger 3 to exchanges infrared signals with the portable terminal 1. In the case of the infrared interface, the communication interface 33 is provided with a light transmitting unit and a light receiving unit, and the portable terminal 1 is also provided with a light transmitting unit and a light receiving unit. The light transmitting unit of the communication interface 33 is coupled with the light receiving unit of the portable terminal 1, and the light receiving unit of the communication interface 33 is coupled with the light transmitting unit of the portable terminal 1. Further, a radio interface having a radio unit for transmitting and receiving radio signals may also be used as the communication interface 33 of the charger 3. In this case, the same radio interface must be provided in the portable terminal 1. However, the radio unit 11A and the antenna AT in Fig. 1 can be used as the radio interface.

[0027]

Therefore, by providing the radio interface in which the portable terminal 1 and the charger 3 are not connected to each other by wires as the communication interface 33, the transfer of the value information of the card 4 to the memory 16 of the portable terminal 1 does not have to be done during charging the portable terminal 1. Even when the portable terminal 1 is not being charged, simply by inserting the card 4 into the insertion slot 3A of the charger 3, the reading unit 37 reads the value information or identification number of the card 4 and transmits the information to the portable terminal 1 via the communication interface 33 to store the information in the memory 16.

[0028]

Further, the embodiment has been described with reference to an example case in which the value information or the card identification number is transferred to the portable terminal 1 by use of the contact-type IC card 4, connected to the charger 3 via the contacts. However, a non-contact-type IC card may also be used. In this case, a radio interface is provided in both the non-contact-type IC card and the reading unit 37, and the reading unit 37 receives the card information transmitted as radio signals and sends the information to the portable terminal 1. Further, to provide the value information or the like to the portable terminal, magnetic cards having the value information or the identification number magnetically recorded thereon, such as PET cards and magnetic stripe cards, may also be used. When these magnetic cards are used, a magnetic card reading and writing unit is used as the reading unit 37 of the charger 3.

[0029]

Further, to provide the value information or the like to the portable terminal 1, optical cards may also be used. When the optical card is used, the reading unit 37 is provided with an interface through which the reading unit 37 can read and rewrite the value information or identification number which is photomagnetically recorded on the optical card. Further, as the portable terminal used in the present invention, any device which uses a battery requiring charging as a power source may be used. For example, it may be a PHS, a portable telephone, or a portable terminal equipped with a display capable of displaying hand-written characters and transmitting/receiving facsimile information.

[0030]

[Effect of the Invention]

As described above, according to the present invention, portable terminal equipment comprising a portable terminal using a battery as a power source and a charger for charging the battery is further provided with a card having settlement-related information stored therein and a reading unit in the charger. When the card is inserted into the charger, the reading unit reads the settlement-related information from the card and provides it to the portable terminal. Thus, when settlement-related information such as value information is to be provided to the portable terminal, it can be provided to the portable terminal easily without providing a special device in the portable terminal. Further, an IC card having at least a memory which stores settlement-related information is used as the card, and the settlement-related information in the card is provided to the portable terminal. Thus, the settlement-related information can be provided to the portable terminal with ease and reliably. Further, since the card and the charger are connect to each other in a non-contact manner, the card can be prevented from becoming damaged even when the card is misconnected. In addition, since the identification number of the card is provided as the settlement-related information in the portable terminal, the charges for the communications carried out by the portable terminal are managed based on the identification number. As a result, the illegitimate communication by an unauthorized rewrite of the value information in the card can be prevented reliably. Further, since the value information in the card is rewritten after the settlement-related information in the portable terminal is rewritten, the double rewriting of the value information in the portable terminal by the same card can be prevented.

[Brief Description of the Drawing]

[Fig. 1] A block diagram showing one embodiment of the portable terminal equipment of the present invention.

[Fig. 2] A diagram (Fig. 2(a)) showing the configuration of the charger for charging the battery of the portable terminal equipment and a diagram (Fig. 2(b)) showing the configuration of the IC card for providing the value information to the portable terminal equipment.

[Fig. 3] A diagram showing the charging state of the portable terminal equipment.

[Descriptions of Reference Numerals]

1	portable terminal
3	charger
4	IC card
5	AC power source
11	communication unit
12	operation unit
13	battery
14	light receiving unit
15	light transmitting unit
16, 43	memories
17	control unit
18	switch
19	latch circuit
21, 22, 34, 35	charging terminals
23, 36	signal terminals
24	charging detector

31	charging circuit
33	communication interface
37	reading unit
41	SIM
42	CPU
44	contact unit

Fig. 1

11: COMMUNICATION UNIT
11A: RADIO UNIT
11B: COMMUNICATION CIRCUIT
12: OPERATION UNIT
14: LIGHT RECEIVING UNIT
15: LIGHT TRANSMITTING UNIT
16: MEMORY
17: CONTROL UNIT
19: LATCH CIRCUIT
24: CHARGE DETECTOR

Fig. 2

3: CHARGER
31: CHARGING CIRCUIT
32: POWER SUPPLY CIRCUIT
33: COMMUNICATION INTERFACE
37: READING UNIT
4: IC CARD
43: MEMORY
44: CONTACT UNIT

Fig. 3

43: MEMORY

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Japanese Utility-Model
Registration No. 3051748

[Title of the Invention] Portable Radio Telephone

[Abstract]

[Object] To add an electronic money function to a portable radio telephone.

[Means for Solution] An electronic money memory area 10b-1 is provided in an IC card 10b of a portable radio telephone 10. An infrared transmitting/receiving section 10h is also provided. A predetermined amount of money is written into the area 10b-1 by a terminal 11 installed in a bank or the like, and a sales amount is read by an IC card reading/writing device 11 at the time of shopping at a store. Input and output of information pertaining to electronic money is carried out between the infrared transmitting/receiving section 10h and an infrared transmitting/receiving section 11a, by means of infrared radiation.

[Claims]

[Claim 1] A portable radio telephone comprising storage means having a monetary information area, writing means for writing given monetary information into the monetary information area, reading means for reading the given monetary information from the monetary information area, information exchange means for exchanging the monetary information with an external terminal, and display means for displaying the monetary information.

[Claim 2] The portable radio telephone of claim 1, wherein the storage means is an IC card integrated into the portable radio telephone.

[Claim 3] The portable radio telephone of claim 1 or 2, wherein the information exchange means comprises an infrared transmitting/receiving section provided in the portable radio telephone and an infrared transmitting/receiving section provided in the external terminal.

[Claim 4] The portable radio telephone of claim 1 or 2, wherein the writing means, the reading means, and the display means use a keypad and a display of the portable radio telephone.

[Claim 5] The portable radio telephone of any of claims 1 to 3, wherein the writing means, the reading means, the information exchange means, and the display means use a keypad, the transmitting/receiving section, and a display of the portable radio telephone in combination.

[Detailed Description of the Invention]

[0001]

[Field of the Invention]

The present invention relates to a portable radio telephone having an electronic money function.

[0002]

[Prior Art]

An IC card featuring a high level of security has been practically used as electronic money in England and other countries. This IC card is used in such a manner that a desired amount of money is withdrawn from a bank account, the amount of the withdrawn money is written into the IC card in advance, and at the time of shopping at a store, the amount of the money spent for shopping is subtracted from the amount of money recorded on the IC card, by means of an IC card reading/writing device installed in the store. Subsequently, a desired amount of additional money is withdrawn and written into the IC card by a terminal installed in a bank or the like.

For example, as shown in Fig. 4, when a user transfers an amount of 10,000 yen into an IC card 2 for electronic money by means of a terminal 1 installed in a bank or the like and wishes to use the IC card 2 to purchase a

120-yen newspaper at a kiosk in a railroad station, the user inserts the card into an IC card reading/writing device 3 installed in the kiosk so as to subtract 120 yen from the money transferred into the card, leaving 9,880 yen in the card. The IC card reading/writing device 3 may have a key via which the purchaser inputs a required password.

[0003]

[Problems that the Invention is to Solve]

The conventional payment system using the IC card for electronic money involves a significant problem, in that the user cannot determine the balance in the IC card.

Meanwhile, a system in which the telephone number of a mobile telephone such as a portable radio telephone is inputted into an IC card has already been put into practical use as a GSM system in Europe. Therefore, using such an IC card as an IC card for electronic money as well has been considered. However, since the above IC card has been downsized and is fixed in the telephone, attaching and detaching the card is difficult when the card is to be used for electronic money. To make the IC card detachable, the specifications, configuration, and the like of the existing telephone must be changed significantly.

[0004]

The object of the present invention is to impart an electronic money function to a portable telephone without making significant changes to the portable telephone, to thereby solve the problems involved in the prior art.

[0005]

[Means for Solving the Problems]

To achieve the above object, the portable radio telephone of the present invention comprises storage means having a monetary information area, writing means for writing given monetary information into the monetary information area, reading means for reading the given monetary information from the monetary information area, information exchange means for exchanging the monetary information with an external terminal, and display means for displaying the monetary information.

[0006]

In the present invention, an IC card integrated into the portable radio telephone may be used as the storage means.

[0007]

Further, in the present invention, the information exchange means may comprise an infrared transmitting/receiving section provided in the portable radio telephone and an infrared transmitting/receiving section provided in the external terminal.

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[0008]

Still further, in the present invention, the writing means, the reading means, and the display means may use a keypad and a display of the portable radio telephone in combination.

[0009]

Still further, in the present invention, the writing means, the reading means, the information exchange means, and the display means may use the keypad, transmitting/receiving section, and display of the portable radio telephone.

[0010]

[Description of the Preferred Embodiments]

Fig. 1 shows one embodiment of the portable radio telephone of the present invention. In Fig. 1, reference numeral 10 designates a portable radio telephone, and reference numeral 11 designates an IC card reading/writing device (electronic money terminal) installed in a bank, store, or the like. In the portable radio telephone 10, reference numeral 10a designates a control circuit (CPU), 10b an IC card, 10c a display, 10d a keypad, 10e a modulation circuit, 10f a demodulation circuit, 10g a transmitting/receiving antenna, 10h an infrared transmitting/receiving section, and 10i a speaker. The hardware provided for imparting the electronic money function is the infrared transmitting/receiving section. Meanwhile, the software provided for imparting the electronic money function is an electronic money memory area 10b-1 (monetary information area) provided in the IC card 10b as shown in Fig. 2. In Fig. 2, 10b-2 designates a memory area for a telephone, 10b-3 a directory file area (operation control area for a telephone and electronic money), and 10b-4 an OS (basic software) area.

Further, the IC card reading/writing device 11 comprises an infrared transmitting/receiving section 11a which corresponds to the above transmitting/receiving section 10h; a control circuit 11b; and the like; and an output terminal 11c is connected to the terminal at the bank or the like.

[0011]

The memory area 10b-2 in the IC card 10b stores a telephone number, information about frequency, authentication (ID) data, and the like which are necessary for connection; and, at the time of originating or receiving a call, the portable radio telephone 10 reads necessary information from this area to thereby function as a telephone. In this regard, the portable radio telephone 10 is no different from a conventional portable radio telephone.

[0012]

The electronic money function is performed in the following manner.

Firstly, a special code is input into the portable radio telephone 10 by means of operating the keypad 10d to place the telephone 10 into an electronic money mode in which the information about a desired amount of money is written into the electronic money memory area 10b-1 of the IC card 10b by the terminal 11 installed in a bank or the like.

Then, at the time of shopping, the sales amount is written into the above electronic money memory area 10b-1 of the IC card 10b by the IC card reading/writing device 11, which is a terminal installed in the store. In this case, the balance after the subtraction of the sales amount written into the IC card 10b is displayed on the display 10c. The terminal 11 and the portable radio telephone 10 exchange information with each other by use of the infrared transmitting/receiving section 11a and the infrared transmitting/receiving section 10h, respectively. The transmission format of infrared radiation complies with, for example, the IrDA (Infrared Data Association) specification as shown in Fig. 3.

[0013]

Further, as described above, the monetary information is input to and output from the IC card 10b by means of infrared radiation. For the sake of maintaining confidentiality, this information is preferably scrambled by a system such as a private key system (such as DES) or a public key system (such as RSA).

[0014]

Further, although the above input and output of the monetary information, ID code, and the like by means of infrared radiation can be carried out by way of the keypad 10d of the portable radio telephone as described above, the input and output means is not limited thereto. For example, an additional switch for switching to the electronic money mode may be provided.

[0015]

Further, the portable radio telephone in the electronic money mode may exchange the monetary information with the terminal not by use of the infrared transmitting/receiving device, but by use of the function of the portable radio telephone as is. However, in the electronic money mode, the portable radio telephone uses frequencies and types of signals which differ from those used in the telephone mode, and the information to be exchanged is scrambled.

[0016]

In addition, the electronic money mode and the telephone mode may be set such that one is given higher priority than the other when they conflict with each other.

[0017]

[Effect of the Invention]

As described above, according to the present invention, the electronic money function is incorporated into the portable radio telephone itself. Therefore, minimal or little change needs to be made to the hardware configuration of the existing portable radio telephone, and the change is made by the incorporation of software. Operation in the electronic money mode is easy, because it involves no insertion and removal of IC card. In particular, when the input and output of the electronic money information is carried out by means of infrared radiation, the information is protected from theft and therefore use of infrared radiation is advantageous from the viewpoint of confidentiality.

[Brief Description of the Drawing]

[Fig. 1] A block diagram showing one embodiment of the present invention.

[Fig. 2] A diagram showing the memory structure of the IC card.

[Fig. 3] A diagram showing an example of the transmission format of infrared radiation.

[Fig. 4] A diagram illustrating the conventional electronic money system.

[Descriptions of Reference Numerals]

10	portable radio telephone
10a	control circuit
10b	IC card
10c	display
10d	keypad
10h	infrared transmitting/receiving section
11	electronic money terminal

Fig. 1

Fig. 2

DIRECTORY FILE

MEMORY AREA FOR TELEPHONE

MEMORY AREA FOR ELECTRONIC MONEY

Fig. 3

PREANGLE

START

DATA

STOP

Fig. 4

TRANSFER MONEY

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Japanese Patent Application,
Laid-Open Publication No. H9-261359

[Title of the Invention] Memory-Card-Including Portable Telephone and Data Transmission Method Using the Same

[Abstract]

[Object] To enable transmission of data in anywhere within a field where a communication line can be used, use of various types of information pieces of large volume, and easy and efficient provision of information to users.

[Means for Solution] By use of a portable telephone 1 comprising a memory card 2, an interface circuit, and a function of reading data from and writing data to the memory card, data in the memory card 2 are transmitted to a telephone line as information, and received data are written into the memory card.

[Claims]

[Claim 1] A memory card-including portable telephone comprising a memory card, an interface circuit, and the function of reading data from and writing data into the memory card.

[Claim 2] A data transmission method using a memory card-including portable telephone, wherein the data in the memory card are transmitted to a telephone line as information and received data are written into the memory card.

[Detailed Description of the Invention]

[0001]

[Field of the Invention]

The present invention relates to a portable telephone which can include a memory card, and to a data transmission method using a memory card-including portable telephone, wherein the data in the memory card are transmitted via a telephone line and data are written into the memory card via a telephone line.

[0002]

[Prior Art]

Conventional data transmission using a portable telephone has been carried out by means of connecting the portable telephone to a facsimile machine, a data editing device (such as a personal computer), or the like via a cable.

[0003]

[Problems to be Solved by the Invention]

Therefore, in the above prior art, transmission and reception of data are possible only at somewhat limited sites and in a well-equipped environment. Further, the prior art involves such problems that the portable telephone cannot store information of various types and amounts, since the amount of information to be stored in the portable telephone is limited by the memory capacity of the portable telephone, and that the efficiency of data entry is low, since a ten-key numerical pad must be used.

[0004]

[Means for Solving the Problems]

The portable telephone of the present invention comprises a memory card, an interface circuit, and the function of reading data from and writing data into the memory card, to thereby solve the above problems.

[0005]

The data transmission method of the present invention uses a memory card-including portable telephone to transmit the data in the memory card via a telephone line as information and write received data into the memory card,

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to thereby solve the problems.

[0006]

According to the above constitution, the data in the memory card is transmitted via a telephone line by the portable telephone, thereby accomplishing transmission of the data. Further, data transmitted via a telephone line are received by the portable telephone and written into the memory card.

[0007]

[Description of the Preferred Embodiments]

Fig. 1 is a diagram illustrating a first embodiment of the portable telephone of the present invention and a data transmission method using the same. The portable telephone 1 of the first embodiment comprises a memory card 2, an interface circuit, and the functions of reading data from and writing data into the memory card 2, controlling, decoding, and displaying the data, and converting the data into sounds. A data editing device 3 (such as a personal computer) which has an interface with the memory card 2 prepares data and writes the data into the memory card 2. The data written into the memory card 2 is transmitted to a telephone line by the portable telephone 1, thereby accomplishing transmission of the data. Meanwhile, the data transmitted via a telephone line is received by the portable telephone 1 and written into the memory card 2. The received data can be displayed on the data editing device 3. Thus, the field-irrelevant functions of the portable telephone can be applied as they are.

[0008]

Fig. 2 is a diagram illustrating a second embodiment of the present invention. In the second embodiment, one of memory cards 2A to 2D having a variety of information stored therein is included into the portable telephone 1, and by use of the appropriate memory card, time and effort for inputting data can be saved and a large volume of information can be used. Illustrative examples of the memory cards 2A to 2D include commercially available telephone number memory cards, special telephone number memory cards, user registration data memory cards, edit data memory cards, and the like. The memory cards are selected freely and the information stored therein is used.

[0009]

Figs. 3(A) and 3(B) are diagrams illustrating the in-communication state and post-communication state, respectively, of a third embodiment of the present invention. In the third embodiment, the content of communication which is important or is to be retained is stored (recorded) in a memory card as is during the communication using a portable telephone 1, and after the communication the stored content can be reproduced or displayed and/or edited by the data editing device.

[0010]

[Effects of the Invention]

As is clear from the above description, according to the present invention, data can be transmitted in anywhere within a field where a telephone line can be used, various types of information pieces of large volume can be handled by the memory of the portable telephone and the memory card, and the information can be provided to users easily and efficiently.

[Brief Description of the Drawing]

[Fig. 1] A diagram illustrating a first embodiment of the portable telephone of the present invention and a data transmission method using the same.

[Fig. 2] A diagram illustrating a second embodiment.

[Figs. 3(A) and 3(B)] Diagrams illustrating the in-communication state and post-communication state, respectively, of a third embodiment.

[Descriptions of Reference Numerals]

1	portable telephone
2	memory card
2A to 2D	memory cards
3	data editing device

Fig. 1

1: PORTABLE TELEPHONE

2: MEMORY CARD

3: DATA EDITING DEVICE

Fig. 2

2A: COMMERCIALLY AVAILABLE TELEPHONE NUMBER MEMORY CARD

2B: SPECIAL TELEPHONE NUMBER MEMORY CARD

2C: USER REGISTRATION DATA MEMORY CARD

2D: EDIT DATA MEMORY CARDS

Fig. 3

(A) RECORDING

(B) REPRODUCTION

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JC03 Rec'd PCT/PTC 02 AUG 2001

Japanese Patent Application,
Laid-Open Publication No. H8-153248

[Title of the Invention] Vending Machine System

[Abstract] (amended)

[Object] To provide a post-paid-type vending machine system using a portable telephone terminal in place of the conventionally used ID card.

[Constitution] Transmission information is input to a portable telephone terminal 1 by a code input means 2. The transmission information includes an individual identification code which can identify an individual user, and a vending machine designation code which specifies a vending machine. The transmission information input to the portable telephone terminal 1 is transmitted in the form of radio signals to one or more of vending machines 6A to 6N by a transmission means 5. The vending machines 6A to 6N receive the transmission information by means of reception means 7, and the vending machine specified by the vending machine designation code included in the received transmission information transmits the individual identification code to a controller 13 by means of information transmission means 10. The controller 13 checks the transmitted individual identification code by means of checking means and returns a sales permission signal to the vending machine which transmitted the individual identification code.

[Claims]

[Claim 1] A vending machine system comprising a portable telephone terminal, one or more vending machines, and a controller which controls the operation(s) of the vending machine(s), wherein

the portable telephone terminal comprises means for inputting the transmission information including an individual identification code which can identify an individual user and a vending machine designation code which specifies a vending machine, and transmission means for transmitting the transmission information in the form of radio signals,

the vending machine comprises reception means for receiving the transmission information, information transmission means for transmitting the transmission information to the controller when the vending machine corresponds to the vending machine designation code, and a commodity ejection section which ejects a commodity in response to a sales permission signal, and

the controller comprises checking means for checking the transmitted individual identification code and transmitting the sales permission signal to the vending machine when determining that a commodity can be sold to the user, and record means for recording a sales amount for each individual identification code.

[Detailed Descriptions of the Invention]

[0001]

[Field of the Invention]

The present invention relates to a vending machine system using a portable telephone terminal such as PHS (personal handy system).

[0002]

[Prior Art]

Heretofore, a post-paid-type vending machine system using a hard ticket ID card (JIS-II type) has been widely known (see, for example, Japanese Patent Application Laid-Open Nos. 63-54695 and 2-202692).

[0003]

In a vending machine system of this type, generally, an ID code for specifying or identifying a user such as an individual or company is read from an ID card such as a magnetic card via a card reader installed in the vending machine; the vending machine is given permission to sell, totals sales amounts for the user on the basis of the ID code, and later bills the user for the totaled sales amounts; and the user pays later.

[0004]

[Problems that the Invention is to Solve]

The above conventional vending machine system must use an ID card customized for the vending machine, or an ID card which also functions as an ID card produced for another purpose (such as a bank card). These days, a variety of ID cards are rampant, and management of these cards has become complicated. Meanwhile, the widespread use of portable telephones is significant. Coming into wide use are not only portable telephones which can communicate within a wide area, but also so-called PHS phones, which can communicate only within a narrow area and are inexpensive and aimed at personal use.

[0005]

These portable telephones each have installed therein as an ID code a telephone number used for paging or billing the user. The ID code can also be used for other purposes. Further, most portable telephones have a telephone number memory having a relatively large free memory space, and a portion of the memory can be used as a user's area. In addition, needless to say, the signal transmission system employed by portable telephones is a radio transmission system.

[0006]

Therefore, the object of the present invention is to provide a vending machine system using a portable telephone terminal in place of the conventionally used ID card.

[0007]

[Means for solving the Problems]

To solve the above problems, the present invention provides a vending machine system comprising a portable telephone terminal, one or more vending machines, and a controller which controls the operation(s) of the vending machine(s), wherein the portable telephone terminal comprises code input means for inputting the transmission information including an individual identification code which can identify an individual user and a vending machine designation code which specifies a vending machine, and transmission means for transmitting the transmission information as radio signals; the vending machine comprises reception means for receiving the transmission information, information transmission means for transmitting the transmission information to the controller when the vending machine corresponds to the vending machine designation code, and a commodity ejection section which ejects a commodity in response to a sales permission signal; and the controller comprises checking means for checking the transmitted individual identification code and transmitting the sales permission signal to the vending machine when determining that a commodity can be sold to the user, and record means for recording a sales amount for each individual identification code.

[0008]

[Action]

According to the present invention, the transmission information is input to the portable telephone terminal by the code input means. The transmission information includes the individual identification code, which can identify an individual user, and the vending machine designation code, which specifies a vending machine. The transmission information input to the portable telephone terminal is transmitted in the form of a radio signal to one or more vending machines via the transmission means. The vending machines receive the transmission information by means of the respective reception means. The vending machine specified by the vending machine designation code included in the received transmission information transmits the individual identification code to the controller by means of the information transmission means. The controller checks the transmitted individual identification code by means of the checking means, and when determining that a commodity can be sold to the user identified by the individual identification code, the controller returns a sales permission signal to the vending machine which transmitted the individual identification code. On the basis of the sales permission signal, the vending machine ejects a selected commodity from the commodity ejection section. Meanwhile, the controller records a sales amount in the record means in relation to the individual identification code of the user who purchased the commodity, and memorizes the sales amount as the data for billing the user later. As described above, the user can purchase commodities from the vending machines by use of the portable telephone terminal and can be billed for the commodities later.

[0009]

[Embodiment]

With reference to the drawings, preferable examples of the present invention will be described.

[0010]

Fig. 1 shows the schematic configuration of the vending machine system according to the present invention. As shown in Fig. 1, the vending machine system comprises a PHS 1 serving as a portable telephone terminal, a plurality of vending machines 6A to 6N, and a controller 13.

[0011]

The PHS 1 comprises an input device 2, such as a keyboard, serving as the code input means; memory 4 which stores input transmission information; a control section 3 which includes a control unit for controlling the overall operation of the PHS 1; and a transmission section 5 which converts the transmission information into radio signals and outputs the radio signals.

[0012]

The transmission information includes an individual identification code which can identify a user (individual or company), and a vending machine designation code which specifies a vending machine. As the individual identification code, there can be used, for example, not only the telephone number allocated to the portable telephone terminal, but also other numbers and symbols which can clearly distinguish a user from other users.

[0013]

The vending machine 6A comprises a communication interface 7 which interfaces with the PHS 1; a microprocessor-integrated vending machine control section 8 which controls the overall control action of the vending machine 6A and carries out necessary signal processing; transmission means 5 which interfaces the vending machine control part 8 with the controller 13 online; and a commodity ejection section 9 which ejects a commodity under the control of the memory 4. The other vending machines 6B to 6N have the same configuration as that of the above vending machine 6A. Therefore, the configurations of the vending machines 6B to 6N will not be described in detail.

[0014]

These vending machines 6A to 6N are connected online to the controller 13 via local buses 11A to 11N and a communication data bus 12. Together with the controller 13, the vending machine control section 8 totally controls the vending machine 6A, on the basis of a control algorithm to be described later (refer to Fig. 2).

[0015]

The controller 13 comprises a microprocessor and necessary memories, refers to memories (not shown) such as ROM and RAM, exchanges data with the vending machines 6A to 6N via the communication data bus 12 and the local buses 11A to 11N, and controls the overall operations of the vending machines on the basis of the control algorithm to be described later (refer to Fig. 2).

[0016]

Next, the control action will be described.

[0017]

Referring to Fig. 2, firstly, by way of the input device 2 a user inputs to the PHS 1 the number of the vending machine he wishes to use (Step S1). Then, the control section 3 reads the ID code out of the memory 4 and transmits the ID code and the vending machine number to the transmission section 5. The transmission section 5 converts the ID code and the vending machine number into radio signals and transmits the radio signals to the vending machines 6A to 6N (Step S2).

[0018]

The vending machines 6A to 6N receive the transmitted ID code and vending machine number (Step S3) and each transmits the ID code and the vending machine number to the vending machine control section 8 via the communication interface 7 and to the controller 13 via a communication interface 10, the local buses 11A to 11N, and the communication data bus 12.

[0019]

The controller 13 receives the ID code (Step S5) and checks the transmitted ID code (Step S6). The evaluation of the ID code includes, for example, a security check for checking whether the user of the particular ID code is banned. When the ID code is determined to be usable, the controller 13 transmits a sales permission signal to the vending machine control section 8 via the communication data bus 12, the local buses 11A to 11N, and the communication interface 10 (Step S7).

[0020]

The vending machine control section 8 receives the sales permission signal (step S8) and then, for example, illuminates the price indicator of a commodity column to thereby permit the purchase of commodities. When the user presses a commodity selection button at this point (Step S9), the vending machine control section 8 takes a selected commodity out of the commodity rack of the vending machine and ejects the commodity from the commodity ejection section 9 (Step S10). Then, the vending machine control part 8 transmits the commodity code of the ejected commodity to the controller 13 (Step S11).

[0021]

The controller 13 receives the commodity code (Step S12), and collects and records sales amount data in relation to any vending machine which sold the commodity among the vending machines 6A to 6N as the data to be billed later.

[0022]

[Effects of the Invention]

As described above, according to the present invention, the vending machine specified in wireless by a portable telephone terminal such as a PHS can effect automatic sales of a commodity in the state in which the user is identified by the ID code of the portable telephone terminal as a result of data exchange between the vending machine and the controller. Thus, it becomes possible to configure a post-paid-type vending machine system, without use of the conventionally used ID card.

[Brief Description of the Drawing]

[Fig. 1] A block diagram showing an example configuration of the vending machine system of the present invention.

[Fig. 2] A block diagram showing an example operation of the vending machine system of the present invention.

[Descriptions of Reference Numerals]

1	PHS
2	input keyboard
3	control section
4	memory
5	transmission section
6A to 6N	vending machines
7	communication interface
8	vending machine control section
9	commodity ejection section
10	communication interface
11A to 11N	local buses
12	communication data bus
13	controller

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Fig. 1

2: INPUT DEVICE

3: CONTROL SECTION

4: MEMORY

5: TRANSMISSION SECTION

7: COMMUNICATION I/O

8: VENDING MACHINE CONTROL SECTION

9: COMMODITY EJECTION SECTION

10: COMMUNICATION I/O

13: CONTROLLER

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Fig. 2

6A-6N: VENDING MACHINES

13: CONTROLLER

S1: INPUT VENDING MACHINE NUMBER

S2: TRANSMIT VENDING MACHINE NUMBER AND ID CODE

S3: RECEIVE VENDING MACHINE NUMBER AND ID CODE

S4: TRANSMIT VENDING MACHINE NUMBER AND ID CODE

S5: RECEIVE ID CODE

S6: CHECK ID CODE

S7: TRANSMIT SALES PERMISSION SIGNAL

S8: RECEIVE SALES PERMISSION SIGNAL

S9: PRESS SELECTION BUTTON

S10: EJECT COMMODITY

S11: TRANSMIT COMMODITY CODE

S12: RECEIVE COMMODITY CODE

S13: RECORD SALES DATA

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Japanese Patent Application,
Laid-Open Publication No. H8-16740

[Title of the Invention] Portable information processing device and information processing system

[Abstract]

[Object] To provide a portable information processing device and an information processing system which can process information more efficiently than prior art.

[Constitution] A signal processing device 1 can receive serial data transmitted as light signals from the CRT of a television receiver by a light receiving unit 4, convert the data into electric signals and store the electric signals, and store the information in an IC card 7 inserted into an IC card insertion slot 5 as required.

[Claims]

[Claim 1] A portable information processing device comprising:

information reception means for receiving in a non-contact manner the information transmitted from a receiver which receives broadcast signals;

storage means for storing the information received by the information reception means;

card reception means for receiving a memory-integrated card;,

selection means for selecting the information stored in the storage means; and

writing means for writing the information selected by the selection means to the memory of the card received in the card reception means.

[Claim 2] A portable information processing device comprising:

information reception means for receiving in a non-contact manner the information transmitted from a receiver which receives broadcast signals;

storage means for storing the information received by the information reception means;

card reception means for receiving a memory-integrated card;

writing and reading means for writing the information stored in the storage means to the memory of the card received in the card reception means and reading the information from the memory of the card;

selection means for selecting the information stored in the storage means and the information stored in the memory of the card; and

display means for displaying the information selected by the selection means.

[Claim 3] The portable information processing device of claim 2, wherein the display means displays the information as characters and displays the information corresponding to the characters as a machine-readable mark.

[Claim 4] The portable information processing device of claim 3, which further comprises a display selection means for selecting whether the characters or the mark is to be displayed by the display means and which displays the characters or the mark based on the result of the selection made by the display selection means.

[Claim 5] An information processing system comprising:

a first device including information reception means for receiving in a non-contact manner the information transmitted from a receiver which receives broadcast signals, storage means for storing the information received by the information reception means, selection means for selecting the information stored in the storage means, and display means for displaying the information selected by the selection means; and

a second device including reading means for reading the information displayed by the display means, and means for carrying out a transaction based on the information read by the reading means.

[Claim 6] An information processing system comprising:

a first device including information reception means for receiving in a non-contact manner the information transmitted from a receiver which receives broadcast signals, storage means for storing the information received by the information reception means, selection means for selecting the information stored in the storage means, card reception means for receiving a memory-integrated card, and writing means for writing the information selected by the selection means to the memory of the card received in the card reception means; and

a second device including reading means for reading the information stored in the memory of the card, and means for carrying out a transaction based on the information read by the reading means.

[Detailed Description of the Invention]

[0001]

[Industrial Applicability]

The present invention relates to a portable information processing device and an information processing system, particularly, a portable information processing device and an information processing system which are used for processing the transaction information associated with, for example, discounts on commodities or services.

[0002]

[Prior Art]

A transaction system has been heretofore known in which distributors or service providers distribute the information associated with discounts on commodities or services as so-called "discount coupons" attached to the inserts in magazines and newspapers and only customers who bring the coupons with them get special discounts.

[0003]

Further, in such a transaction system, it has also been practiced that the distributors and the service providers ask the customers to write, for example, their names and addresses on the discount coupons and collect the coupons to acquire customer information.

[0004]

[Problems to be Solved by the Invention]

As described above, the conventional system uses pieces of paper such as the discount coupons to provide and collect information. However, processing the information takes much time and efforts.

[0005]

The present invention has been invented to solve the problem of the prior art, and an object of the present invention is to provide a portable information processing device and an information processing system which can process the information more efficiently than the prior art.

[0006]

[Means for solving the Problems]

The portable information processing device of claim 1 comprises information reception means for receiving in a non-contact manner the information transmitted from a receiver which receives broadcast signals, storage means for storing the information received by the information reception means, card reception means for receiving a memory-integrated card, selection means for selecting the information stored in the storage means, and writing means for writing the information selected by the selection means to the memory of the card received in the card reception means.

[0007]

The portable information processing device of claim 2 comprises information reception means for receiving in a non-contact manner the information transmitted from a receiver which receives broadcast signals, storage means for storing the information received by the information reception means, card reception means for receiving a memory-integrated card, a writing and reading means for writing the information stored in the storage means to the memory of the card received in the card reception means and reading the information from the memory of the card, selection means for selecting the information stored in the storage means and the information stored in the memory of the card, and display means for displaying the information selected by the selection means.

[0008]

The portable information processing device of claim 3 is the portable information processing device of claim 2 in which the display means displays the information as characters and displays the information corresponding to the characters as a machine-readable mark.

[0009]

The portable information processing device of claim 4 is the portable information processing device of claim 3 which further comprises a display selection means for selecting whether the characters or the mark is to be displayed by the display means and which displays the characters or the mark based on the result of the selection made by the display selection means.

[0010]

The information processing system of claim 5 comprises a first device and a second device. The first device includes information reception means for receiving in a non-contact manner the information transmitted from a receiver which receives broadcast signals, storage means for storing the information received by the information reception means, selection means for selecting the information stored in the storage means, and display means for displaying the information selected by the selection means. The second device includes reading means for reading the information displayed by the display means, and means for carrying out a transaction based on the information read by the reading means.

[0011]

The information processing system of claim 6 comprises a first device and a second device. The first device includes information reception means for receiving in a non-contact manner the information transmitted from a receiver which receives broadcast signals, storage means for storing the information received by the information reception means, selection means for selecting the information stored in the storage means, card reception means for receiving a memory-integrated card, and writing means for writing the information selected by the selection means to the memory of the card received in the card reception means. The second device includes reading means for reading the information stored in the memory of the card, and means for carrying out a transaction based on the information read by the reading means.

[0012]

[Action]

According to the portable information processing device and the information processing system which have the above constitutions, the information which has heretofore been provided and collected by using pieces of paper such as discount coupons can be handled as electric signals, and more information can be processed more efficiently.

[0013]

[Embodiments]

The embodiments of the present invention will be described in detail with reference to drawings hereinafter.

[0014]

Figs. 1 to 3 show the external configuration of a signal processing device 1 serving as the portable information processing device of the present invention. As shown in Figs. 1 to 3, a display 2 comprising a liquid crystal display device and a key input section 3 are provided on the surface of the signal processing device 1, and a light receiving unit 4 and an IC card insertion slot 5 are provided on the sides of the device 1. Further, reference numeral 6 denotes a battery accommodating space, and 7 an IC card.

[0015]

Further, the display 2 has a character display section 2a which displays information by characters, numerals and the like, and a bar-code display section 2b which displays the information by a bar code.

[0016]

Fig. 4 shows the functional configuration of the above signal processing device 1. As shown in Fig. 4, the signal processing device 1 comprises a light-receiving unit 10 which receives light signals from the outside; a photoelectric conversion unit 11 which converts the received light signals into electric signals; a CPU 12 which controls all the functions of the signal processing device; a ROM 15 which stores the operating program of the CPU 12; a RAM 16 which temporarily stores the result of processing when the program is executed and the signals from the light-receiving unit 10; an EEPROM 17 which stores a history of use of the signal processing device and the information specific to the signal processing device such as the number of writings to an IC card, the contents of the writings and the information associated with the owner of the signal processing device; an LCD 13 which displays the contents of the RAM 16; a driver 14 which displays the data on the LCD 13; a contact 18 which electrically connects the signal processing device to the IC card 7; a keyboard 19; and a battery 20.

[0017]

Fig. 5 shows the external configuration of the IC card 7. The IC card 7 comprises a CPU-integrated IC module 30, a magnetic stripe 31 and embossed letters 32. As shown in Figs. 2 and 3, the signal processing device 1 can receive such an IC card 7 and read and write the data in the IC card 7 via the contact 33 of the IC card 7.

[0018]

Further, as shown in Fig. 6, the signal processing device 1 can receive the data series transmitted as light signals 41 from the CRT of a television receiver 40 by the light receiving unit 4 of the signal processing device 1, convert the data into electric signals and store the electric signals, and store the information in the IC card 7 as required.

[0019]

The light signals emitted from the television receiver 40 are modulated in accordance with the brightness and color of the picture on the television. Examples of the information include those about scores, date and time, and television programs which are provided to viewers.

[0020]

Next, a description will be given to the activation procedure of the signal processing device 1 with reference to Fig. 7.

[0021]

Firstly, an operator presses the "ON/OFF" switch provided in the key input section 3 on the surface of the signal processing device 1 to activate the device 1. When the switch is pressed down, power is supplied from the internal battery stored in the battery accommodating space 6 to the CPU 12 to activate the CPU 12. Then, firstly, the activated CPU 12 initializes peripheral components (101) and performs self-diagnostic check (102).

[0022]

When the CPU 12 has judged that it is in an anomalous state, the CPU 12 displays on the LCD 13 a message notifying the anomalous state (103).

[0023]

On the other hand, when the CPU 12 has judged that it is in a normal state, the CPU 12 displays a message for urging the operator to insert an IC card and enters an IC card insertion-waiting state (104).

[0024]

In this state, when the IC card 7 is inserted, CPU 12 detects the insertion, activates the IC card 7 and receives the initial response data transmitted from the IC card 7 (105).

[0025]

Then, the CPU 12 refers to the received initial response data to determine whether the inserted IC card 7 is a compatible card (106).

[0026]

When the CPU 12 receives incompatible initial response data or fails to receive the initial response data, it receives a message indicating that the card is incompatible and stops sending electric signals to the card (107). Then, the signal processing device 1 itself stops and returns to the state before its activation.

[0027]

Next, a description will be given to the procedure of verifying the password number of the operator by using the inserted IC card 7 with reference to Fig. 8.

[0028]

Firstly, the CPU 12 displays a message urging the operator to enter the password number into the signal processing device 1 and enters a password number entry-waiting state (110).

[0029]

Seeing the message, the operator enters his password number by using the numeric keys provided in the key input section 3 on the surface of the signal processing device 1. When the CPU 12 detects the entry of the password number, it transmits the password number to the connected IC card 7 to request the verification of the password number. When the IC card receives the request, it compares the password number stored in the card with the entered password number and outputs the result of the comparison to the signal processing device (111).

[0030]

When the signal processing device 1 receives the result of the comparison from the IC card 7, it evaluates the result of the comparison from the response data, and when it is determined that the password number stored in the IC card 7 matches with the entered password number, indicating that the result of the verification is normal, the signal processing device 1 displays a message indicating that the two password numbers match with each other and carries out the next process to be described later (112).

[0031]

On the other hand, when the signal processing device 1 has detected the response data implying a mismatch between the two password numbers as a result of the above evaluation, it displays not only a message indicating that there is a mismatch between the password numbers but also a message urging the operator to enter the password number again (113). Further, when the response data indicate that the number of mismatches of the password numbers has exceeded an acceptable number of times, the signal processing device 1 displays a message indicating that the card is unusable and stops supplying electric signals to the IC card 7 (114).

[0032]

Then, a description will be given to a first example of the procedure of storing the data series received from the television receiver 40 by the signal processing device 1 in the IC card 7 with reference to Fig. 9.

[0033]

As described above, when the entered password number matches with the password number stored in the IC card 7 in the above password number verification process, the CPU 12 displays a message indicating that the two password numbers match with each other and then waits for the operator to press a numeric key (1 or 2) and then the "YES/=" key (120) in the key input section 3 .

[0034]

In this state, when these keys are pressed down, the light signals transmitted from the television receiver 40 to the signal processing device 1 are received by the light-receiving unit 10, and the data series obtained from the light signals are stored in the predetermined area of the RAM 16 integrated in the signal processing device 1 in order (121).

[0035]

In this case, when the numeric key "1" has been pressed down in the above numeric key pressing process, the data storing process is terminated when the predetermined memory area is filled with the received data series. Meanwhile, when the numeric key "2" has been pressed down, the data storing process is continued by deleting the oldest data series out of the data series stored in the area when the predetermined memory area is filled with the received data series.

[0036]

Further, when the CPU 12 detects it during the data series storing process that the "NO/CLR" key has been pressed down, the CPU 12 terminates the data series storing process and displays the latest data series out of the data series stored in the predetermined area of the RAM 16 in the character display section 2a of the display 2 (122).

[0037]

In this state, each time the "BACK" key in the key input section 3 is pressed down, the data series is displayed in turn from the newer data series to the older data series. This operation continues until the oldest data series is displayed. Further, in this state, when the "NO/CLR" key is pressed down, the data series displayed on the display 2 at the moment is deleted from the RAM 16 and the subsequent data series is displayed. By this operation, unnecessary data series can be deleted from the data series stored in the predetermined area of the RAM 16, thereby leaving only necessary data series in the RAM 16 (123).

[0038]

Then, when the operator presses the "YES/=" key down, the CPU 12 detects the press (124). Thereafter, the CPU 12 checks whether there are any data series left in the predetermined area of the RAM 16. When there are no data series left in the predetermined area, the CPU 12 displays a message indicating that there are no data series left in the predetermined area of the RAM 16. On the other hand, when there are still some data series left in the predetermined area of the RAM 16, the CPU 12 writes these data series to the

IC card 7 in order (125).

[0039]

Next, a description will be given to a second example of the procedure of storing the data series received from the television receiver 40 by the signal processing device 1 in the IC card 7 with reference to Fig. 10.

[0040]

As in the case of the above first example, when the entered password number matches with the password number stored in the IC card 7, the CPU 12 displays a message indicating that the two password numbers match with each other and then waits for the operator to press a numeric key (1 or 2) and then "YES/=" key (130) in the key input section 3.

[0041]

In this state, when these keys are pressed down, the light signals transmitted from the television receiver 40 to the signal processing device 1 are received by the light-receiving unit 10 (131), and the data series obtained from the light signals are displayed on the display 2 in order (132).

[0042]

In this state, when the "YES/=" key is pressed down (133), the data series displayed at the moment is stored in the predetermined area of the RAM 16 integrated in the signal processing device 1 (134).

[0043]

In this case, when the numeric key "1" has been pressed down in the above numeric key pressing process, the data storing process is terminated when the predetermined memory area is filled with the received data series. Meanwhile, when the numeric key "2" has been pressed down, the data storing process is continued by deleting the oldest data series out of the data series stored in the area when the predetermined memory area is filled with the received data series.

[0044]

Further, when the CPU 12 detects it during the data series storing process that the "NO/CLR" key has been pressed down, the CPU 12 terminates the data series storing process and displays the latest data series out of the data series stored in the predetermined area of the RAM 16 in the character display section 2a of the display 2 (135).

[0045]

In this state, each time the "BACK" key is pressed down, the data series is displayed in turn from the newer data series to the older data series. This operation continues until the oldest data series is displayed. Further, in this state, when the "NO/CLR" key is pressed down, the data series displayed on the display 2 at the moment is deleted from the RAM 16 and the subsequent data series is displayed. By this operation, unnecessary data series can be deleted from the data series stored in the predetermined area of the RAM 16, thereby leaving only necessary data series in the RAM 16 (136).

[0046]

Then, when the operator presses the "YES/=" key, the CPU 12 detects the press (137). Thereafter, the CPU 12 checks whether there are any data series left in the predetermined area of the RAM 16. When there are no data series left in the predetermined area of the RAM 16, the CPU 12 displays a message indicating that there are no data series left. On the other hand, when there are still some data series left in the predetermined area of the RAM 16, the CPU 12 writes these data series to the IC card 7 in order (138).

[0047]

The data series stored in the IC card 7 as described above can be referred to in accordance with the following procedure.

[0048]

Firstly, to terminate the above process of writing the data series to the IC card 7, after going through the procedures shown in Figs. 9 and 10, the operator presses the "NO/CLR" key, the numeric key "1" and the "YES/=" key in this order.

[0049]

When the CPU 12 of the signal processing device 1 detects the presses, it displays a message urging the operator to enter the password number. Thereby, the aforementioned password number verification process using the IC card is carried out.

[0050]

Then, when the CPU 12 receives the response data indicating that the entered password number is valid from the IC card 7, the CPU 12 then carries out the card access process as described below (139).

[0051]

That is, firstly, the CPU 12 issues a data series reading command to the IC card 7. When the IC card 7 receives the command from the signal processing device 1, it checks whether it has any data series stored therein. When the IC card 7 has no data series, it outputs the response data indicating that it has no data series to the signal processing device 1. On the other hand, when the IC card 7 does have data series, it outputs the stored data series in order. The CPU 12 of the signal processing device 1 determines whether the response data from the IC card is data series or not. When it is data series, the CPU 12 stores the data series in the RAM 16 in order and displays the latest data series on the display 2. On the other hand, when it is not data series, the CPU 12 displays a message indicating that no data series is stored in the IC card 7 on the display 2.

[0052]

As required , the operator carries out editing processing such as the aforementioned process of checking/deleing the data series in the RAM 16 and checking whether the data series is needed (140) and then presses the "YES/=" key (141). Thus, the updated data series group can be written to the IC card in accordance to the aforementioned procedure (142) Notably, the above-mentioned password number may be omitted, and the IC card may be inserted at the point A in Fig. 10 in order to write information therein.

[0053]

As described above, the data series received from the outside by the signal processing device 1 are stored in the IC card 7 (ROM) by the signal-receiving process and the data series-writing process. Meanwhile, in the IC card, the name, address, birth date, gender and the like of the owner are stored as owner information.

[0054]

A description will be given to a specific example of the case where the card owner receives service in the store or the like by using the above IC card 7.

[0055]

For example, there may be a case where the card owner enters the store or the like with the IC card 7 and receives service by using the aforementioned signal processing device 1, bar-code reader 50 and the like provided in the store as shown in Fig. 12 or a case where the card owner enters the store or the like with his own signal processing device 1 and receives service.

[0056]

Further, it is also possible for the card owner to receive the same service by carrying only the IC card 7 with him, inserting the IC card 7 into the IC card insertion slot 5 of a special information display device 60, as shown in Fig.

13, which is provided in the store and displaying the data stored in the card on the display 2. The information display device 60 is a stationary device having an optical scanning unit 61 for reading a bar code. The information display device 60 reads a commodity code printed on a commodity with the optical scanning unit 61 and displays the service information associated with the commodity code when such service information is stored in the IC card 7.

[0057]

Further, it is also possible for the card owner to receive the same service by providing a special information printing device 70 as shown in Fig. 14 in the store, inserting the IC card 7 into the IC card insertion slot 5 of the information printing device 70, displaying the data stored in the card on the display 2 and printing the data on a receipt 71. The service information is printed on the receipt 71 as a bar code and characters, and the receipt 71 can be used as a service ticket.

[0058]

A description will be given to the case where the card owner enters the store or the like with the IC card 7 and receives service by the signal processing device 1 with reference to Fig. 15.

[0059]

The card owner activates the signal processing device 1 by pressing the "ON/OFF" switch on the surface of the device and carries out the activation process, card insertion process and password number verification process by the procedures described with reference to Figs. 7 and 8.

[0060]

Then, when the password number has been verified to be proper, the CPU 12 waits for the card owner to press a numeric key and then the "YES/=" key on the signal processing device 1 (201).

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[0061]

In this state, when the CPU 12 in the signal processing device 1 detects that the "YES/=" key has been pressed after a key (for example, "3" key) for displaying the data series stored in the card has been pressed, it issues a data series reading command to the IC card 7. When the IC card 7 receives the command, it checks whether any data series is stored in its EEPROM. When the IC card 7 has no data series stored therein, it outputs the response data indicating that it has no data series to the signal processing device 1. On the other hand, when the IC card 7 has data series stored therein, it outputs the data series to the signal processing device 1 in order (202).

[0062]

The CPU 12 in the signal processing device determines whether the response data from the IC card 7 is data series or not. When it is data series, the CPU 12 stores the data series in the RAM 16 in order and displays the latest data series on the display 2. On the other hand, when it is not data series, the CPU 12 displays a message indicating that no data series is stored in the IC card 7. Thereafter, the card owner displays the data series associated with the service he wishes to receive on the display 2 by pressing the "BACK" key or the "NEXT" key (203).

[0063]

After displaying the data series associated with the service the card owner wishes to receive in the store, he presses a key for selecting the service and then the "YES/=" key (204).

[0064]

After detecting the presses, the signal processing device 1 issues an owner information reading command to the IC card 7. When the IC card 7 receives the command, it checks whether the information about the card owner is stored in its EEPROM. When the IC card 7 has the information, it outputs the owner information corresponding to the pressed key to the signal processing device 1 as response data (205).

[0065]

When the signal processing device 1 receives the owner information, it combines the data series displayed on the display 2 and the received owner information data (206), converts the combined data into a bar code (207) and displays the bar code in the bar-code display section 2b of the display 2 (208).

[0066]

In this state, a salesclerk reads the bar-code data displayed in the bar-code display section 2b by using the bar-code reader 50 (209).

[0067]

The read bar-code data is sent to and stored in the terminal installed in the store. The terminal can not only process the contents of the service indicated by the data series included in the bar-code data but also read the owner information (including name, age and gender) associated with the IC card owner who has received the service from the IC card and store the information.

[0068]

The customer information can be stored and managed efficiently in the store or the service providing company by the above owner information.

[0069]

Although, in the above example, the overall owner information is read from the IC card 7 and combined with the data series, it is also possible to create the contents of service based on, for example, the gender information out of the owner information received from the IC card 7.

[0070]

For example, a discount rate is calculated from the data series displayed on the display and the gender information out of the owner information read from the IC card (206), converted into bar-code data (207) and displayed in the bar-code display section 2b (208). This can be exemplified by the case where a female customer gets a discount of 30% while a male customer gets a discount of 20%.

[0071]

Further, a description will be given to a specific example of the case where the contents of the services the IC card owner has received are stored in the EEPROM of the IC card as a service history and used for subsequent services.

[0072]

When the data series associated with the service the card owner wishes to receive in the store is displayed (203) and the card owner presses a key to select the service and then the "YES/=" key, the signal processing device 1 detects the presses (204). Thereafter, the signal processing device 1 issues a command to read the service history information associated with the data series which is currently displayed on the display 2 to the IC card 7 (205).

[0073]

When the IC card 7 receives the command, it checks whether the history information associated with the service displayed on the display 2 is present in the service history information stored in its EEPROM. When the history information is present, the IC card 7 outputs the history information to the signal processing device 1 as response data.

[0074]

When the signal processing device 1 receives the history information as the response data, it creates the contents of the service to be provided this time based on the number of times the card owner has received the service in the past (206), converts the service contents into bar-code data (207) and displays the bar-code data in the bar-code display section 2b (208). This is, for example, the case where a discount rate is increased according to the number of times the card owner has received the service. More specifically, for example, the discount rate is increased by 3% each time the card owner has received the service in the past. On the other hand, when the card owner has received the same service even once in the past, that is, when at least one piece of the history information associated with the service is present, the discount rate is set to be zero and can be converted into bar-code data and displayed.

[0075]

Further, a description will be given to a specific example of the case where the information (called "service type information") indicating the grade of the service the owner can receive is stored in the EEPROM of the IC card 7.

[0076]

When the data series associated with the service the card owner wishes to receive in the store is displayed (203) and the card owner presses a key to select the service and then the "YES/=" key, the signal processing device 1 detects the presses (204). Thereafter, the signal processing device 1 issues a command to read the service type information associated with the data series which is currently displayed on the display 2 to the IC card 7 (205).

[0077]

When the IC card 7 receives the command, it checks whether there is any service type information in its EEPROM. When there is service type information, the IC card 7 outputs the information to the signal processing device as response data.

[0078]

When the signal processing device 1 receives the service type information, it creates the contents of the service by using the data series displayed on the display 2 and the received service type information (206), converts the service contents into bar-code data (207) and displays the bar-code data in the bar-code display section 2b (208). The contents of the service are such that a higher discount rate is associated with the service type information of higher grade. Alternatively, the service contents may also be created by reading the owner information from the IC card when the signal processing device 1 receives the service type information and combining the gender information included in the owner information and the service grade information.

[0079]

As for the type of the information which is read from the IC card 7 and combined with the data series displayed on the display 2 by computation as described above, it may be determined by the key pressed to select the service to be inputted in the above step 204. Alternatively, since the information to be combined with the data series is defined by the contents of the data series in advance, the signal processing device 1 can perform the above processing automatically in accordance therewith.

[0080]

Further, the contents of the service received above are written to the EEPROM in the IC card 7 as a service history. This is carried out in such a manner that after the bar code is read by the bar-code reader 50 (209), when a key (for example, numeric key "5") to specify the writing of the service history and then the "YES/=" key (210) are pressed down, the signal processing device 1 orders the IC card 7 to write the data displayed on the display 2 to the EEPROM (211).

[0081]

Alternatively, the above writing process may be performed in such a manner that the terminal to which the bar-code reader 50 is connected transmits service information of serial data in the form of an optical signal, and the light receiving unit 4 of the signal processing device 1 receives the optical signal, converts it to an electric signal, and then issues a writing command to the IC card 7.

[0082]

Fig. 16 is an embodiment of a stationery signal processing device 1a as another embodiment. In this case, the data series transmitted from the television receiver 40 is received through the cable which is electrically connected to the receiver directly. The device 1a can be shared between the receiver and a decoder for CATV or the like. Further, it is also possible to configure the IC card 7 such that it serves as a key for enabling a decoding function (or key for descrambling). In this case, the information about scores and the like which is transmitted from the CATV can be directly written to the IC card by inserting the IC card into the stationery signal processing device 1a.

[0083]

Fig. 17 shows an embodiment of a signal processing device (to be referred to as "two-way communication signal processing device" in the present embodiment) 1c which is a remote control for remote-controlling the television receiver 40 with a mechanism for accessing the IC card 7.

[0084]

In the case of the signal processing device 1c of the present embodiment, the "*" key and "#" key provided on the surface correspond to the "YES/=" key and "NO/CLR" key of the aforementioned signal processing device 1, respectively. Further, a portion (for example, a bottom-right portion) of the

CRT of the television receiver 40 can be used as the display 2, and the information a viewer wishes to display is displayed in the portion of the CRT of the television receiver 40.

[0085]

The signal processing device 1c can receive light signals by directing the light receiving unit 4 to the television receiver 40 and transmit the received data from a light transmitting unit 4c to the television receiver 40. The signal processing device 1c causes the television receiver 40 to display the received data, selects necessary data and writes the data to the IC card 7.

[0086]

Further, in the above embodiment, the signal processing device 1c can also be configured such that the device 1c compares the time and date generated by the device 1c with the time and date received from the television receiver 40, determines that the received data is valid data only when they match with each other and then writes the above information to the IC card 7.

[0087]

This makes it impossible to forge the information obtained from a television by reproducing the information by a video tape.

[0088]

The operation of storing the program information associated with the program whose information is stored in the IC card enables a service provider to simultaneously know a television program for which provision of the score information becomes effective. In this case, the information provider can acquire the individual information (who) stored in the IC card and the information about when he has watched what program. Thus, the information provider can acquire both the information about an individual using the score information and the information about the program to which the score information should be provided at the same time.

[0089]

Further, although, in the above embodiment, a description has been given to the case where the information is obtained from light signals or electric signals, the information may also be obtained from the sounds from radio broadcasting or television broadcasting, for example. Further, other than light, sound may be used as means for transmitting information.

[0090]

Further, it is needless to say that the types of the keys in the key input section 3 of the signal processing device 1 and the methods of data processing can be changed as necessary in the above embodiments. Further, other than characters and a bar code, the information may be outputted by use of light, sound, or radio waves.

[0091]

[Effects of the Invention]

As described above, according to the portable information processing device and information processing system of the present invention, the information which has heretofore been provided and collected by using pieces of paper such as discount coupons can be handled as electric signals, and more information can be processed more efficiently.

[Brief Description of the Drawing]

[Fig. 1] A diagram showing the external configuration of the signal processing device of one embodiment of the present invention.

[Fig. 2] A diagram showing the external configuration of the signal processing device of Fig. 1.

[Fig. 3] A diagram showing the external configuration of the signal processing device of Fig. 1.

[Fig. 4] A diagram showing the block configuration of the signal processing device of Fig. 1.

[Fig. 5] A diagram showing the external configuration of the IC card.

[Fig. 6] A diagram for illustrating the process of receiving the information.

[Fig. 7] A diagram for illustrating the activation process of the signal processing device.

[Fig. 8] A diagram for illustrating the verification process by the signal processing device.

[Fig. 9] A diagram for illustrating the process of writing data by the signal processing device.

[Fig. 10] A diagram for illustrating the process of writing data by the signal processing device.

[Fig. 11] A diagram for illustrating the data processing by the signal processing device.

[Fig. 12] A diagram for illustrating the process of reading data.

[Fig. 13] A diagram showing the configuration of the information display device.

[Fig. 14] A diagram showing the configuration of the information printing device.

[Fig. 15] A diagram for illustrating the data processing by the signal processing device.

[Fig. 16] A diagram showing another embodiment of the signal processing device.

[Fig. 17] A diagram showing still another embodiment of the signal processing device.

[Descriptions of Reference Numerals]

1 signal processing device

2 display

4 light-receiving unit

5 IC card insertion slot

Fig. 1

Fig. 2

Fig. 3

Fig. 4

10: LIGHT-RECEIVING UNIT

11: PHOTOELECTRIC CONVERSION UNIT

14: DRIVER

18: CONTACT

19: KEYBOARD

20: BATTERY

Fig. 5

Fig. 6

Fig. 7

A: SIGNAL PROCESSING DEVICE

B: PRESS "ON/OFF" KEY

101: INITIALIZATION

102: SELF-DIAGNOSTIC CHECK

C: " SIGNAL PROCESSING DEVICE IS ANOMALOUS"

103: NORMAL ?

D: "PLEASE INSERT CARD"

104: CARD INSERTED ?

105: ACTIVATE THE CARD

E: IC CARD

F: ELECTRICAL ACTIVATION

G: INITIAL RESPONSE DATA

106: COMPATIBLE CARD ?

107: DEACTIVATE THE CARD

H: "INCOMPATIBLE CARD"

I: POWER OFF

J: TO THE NEXT PROCESS

Fig. 8

A: SIGNAL PROCESSING DEVICE

B: "PLEASE INSERT YOUR PASSWORD NUMBER"

C: PRESS NUMERIC KEY AND "YES/=" KEY

110: PASSWORD NUMBER ENTERED ?

111: ACCESS CARD

D: IC CARD

E: PASSWORD

F: VERIFICATION RESULT

112: VERIFICATION SUCCEEDED ?

H: "VERIFICATION FAILED"

113: VERIFICATION FAILED ?

114: DEACTIVATE THE CARD

I: "THE CARD IS UNUSABLE"

J: "VERIFICATION SUCCEEDED"

K: POWER OFF

L: TO THE NEXT PROCESS

Fig. 9

A: SIGNAL PROCESSING DEVICE

B: PRESS NUMERIC KEY (1 OR 2) AND "YES/=" KEY

120: KEY INPUT ?

121: STORE DATA SERIES

C: PRESS "NO/CLR" KEY

122: KEY INPUT ?

123: EDITING PROCESS

D: PRESS "YES/=" KEY

124: KEY INPUT ?

125: ACCESS CARD

E: IC CARD

F: WRITING OF DATA SERIES

G: WRITING PROCESS

H: RESULT OF THE PROCESS

I: "WRITING SUCCEEDED"

J: TO THE NEXT PROCESS

Fig. 10

A: SIGNAL PROCESSING DEVICE

B: PRESS NUMERIC KEY (1 OR 2) AND "YES/=" KEY

130: KEY INPUT ?

131: DATA SERIES RECEIVED ?

C: PRESS "YES/=" KEY

133: KEY INPUT ?

D: "DATA SERIES"

132: DISPLAY DATA SERIES

134: STORE DATA SERIES

E: PRESS "NO/CLR" KEY

135: KEY INPUT ?

136: EDITING PROCESS

F: PRESS "YES/=" KEY

137: KEY INPUT ?

138: ACCESS CARD

G: IC CARD

H: WRITING OF DATA SERIES

I: WRITING PROCESS

J: RESULT OF THE PROCESS

K: "WRITING SUCCEEDED"

L: TO THE NEXT PROCESS

Fig. 11

A; SIGNAL PROCESSING DEVICE

B: PRESS "YES/=" KEY

139: ACCESS CARD

C: IC CARD

D: READING OF DATA SERIES

E: READING PROCESS

F: DATA SERIES

140: EDITING PROCESS

141: KEY INPUT ?

142: ACCESS CARD

G: IC CARD

H: WRITING OF DATA SERIES

I: WRITING PROCESS

J: RESULT OF THE PROCESS

K: "WRITING SUCCEEDED"

L: TO THE NEXT PROCESS

Fig. 12

Fig. 13

Fig. 14

Fig. 15

A: SIGNAL PROCESSING DEVICE

B: PRESS NUMERIC KEY "3" AND "YES/=" KEY

201: KEY INPUT ?

202: ACCESS CARD

C: IC CARD

D: READING OF DATA SERIES

E: READING PROCESS

F: DATA SERIES

G: "DATA SERIES"

203: SELECT AND DISPLAY DATA SERIES

H: PRESS SERVICE SELECTION KEY AND "YES/=" KEY

204: KEY INPUT ?

205: ACCESS CARD

I: IC CARD

J: READING OF INFORMATION (SUCH AS OWNER INFORMATION)

K: READING PROCESS

L: VARIOUS INFORMATION

206: COMBINE THE DATA SERIES AND THE VARIOUS INFORMATION THROUGH COMPUTATION

207: PREPARE BAR-CODE DATA

M: "DATA COMBINED TROUGH COMPUTATION"
"BAR-CODE DATA"

208: DISPLAY THE DATA COMBINED THROUGH COMPUTATION AND THE BAR-CODE DATA

209: READING THE BAR-CODE DATA BY BAR-CODE READER

O: PRESS NUMERIC KEY "5" AND "YES/=" KEY

210: KEY INPUT ?

211: ACCESS CARD

P: IC CARD

Q: WRITING OF SERVICE HISTORY

R: WRITING PROCESS

S: RESULT OF THE PROCESS

T: TO THE NEXT PROCESS

Fig. 16

Fig. 17

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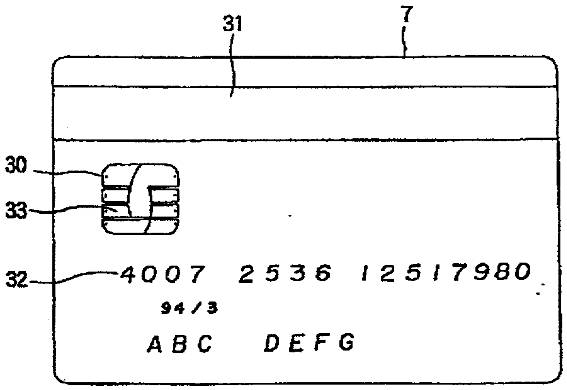
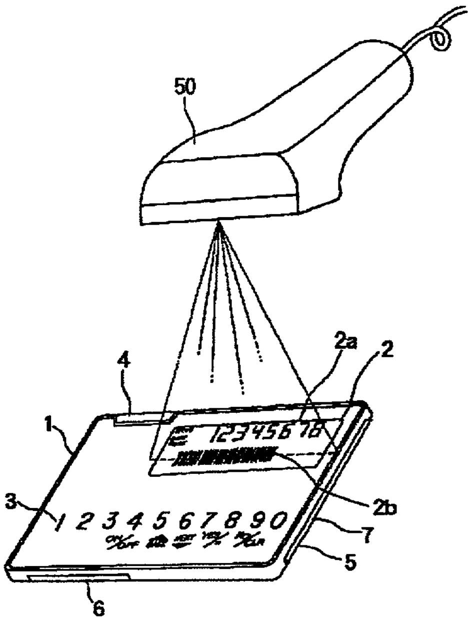
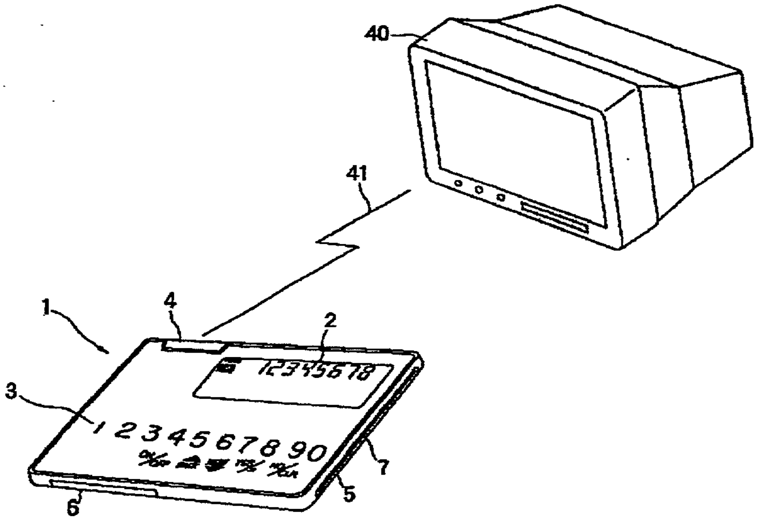
【図５】


31
7
30
33
32
4007 2536 12517980
94/3
ABC DEFG

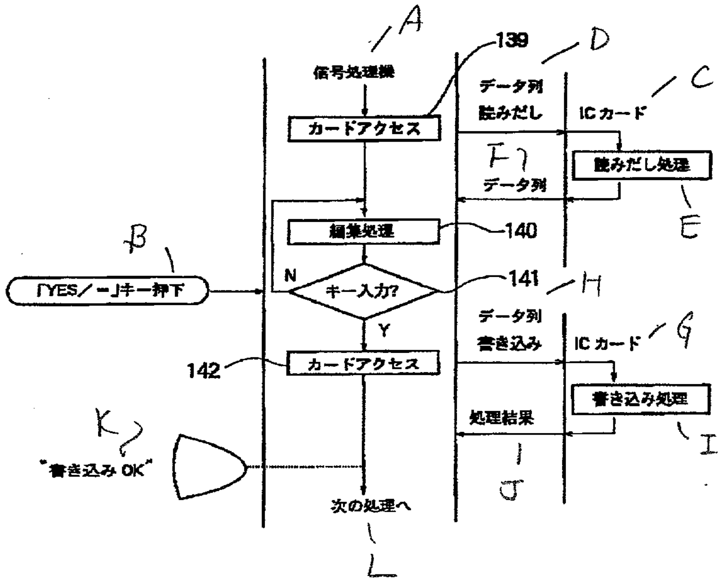
【図１２】


50
2a
2
4
1
12345678
2b
3
1234567890
7
5
6

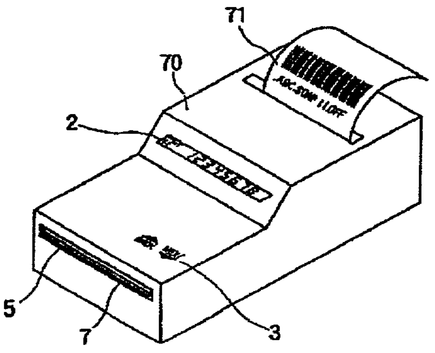
【図６】


40
41
1
4
2
12345678
3
1234567890
7
5
6

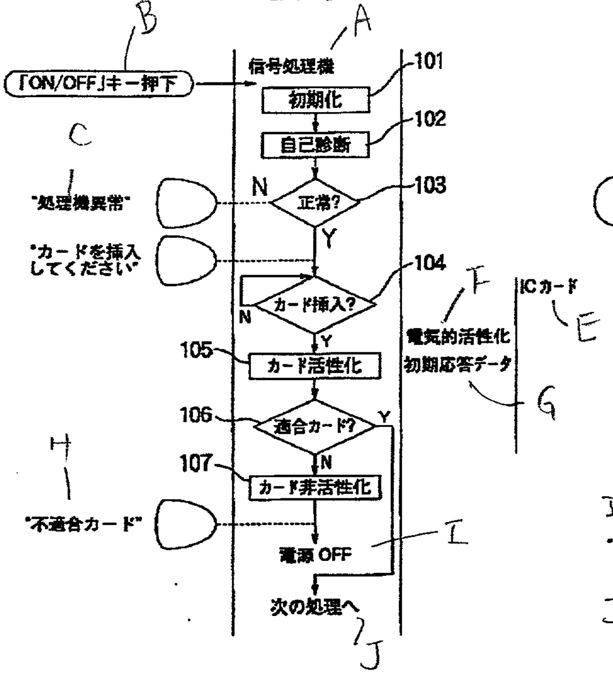
【図１１】


A
139
D
信号処理機
データ列
読みだし
C
ICカード
カードアクセス
F
読みだし処理
データ列
E
編集処理
140
B
「YES／→」キー押下
N
キー入力?
141
H
Y
データ列
書き込み
G
ICカード
142
カードアクセス
書き込み処理
処理結果
I
K
"書き込み OK"
J
次の処理へ
L

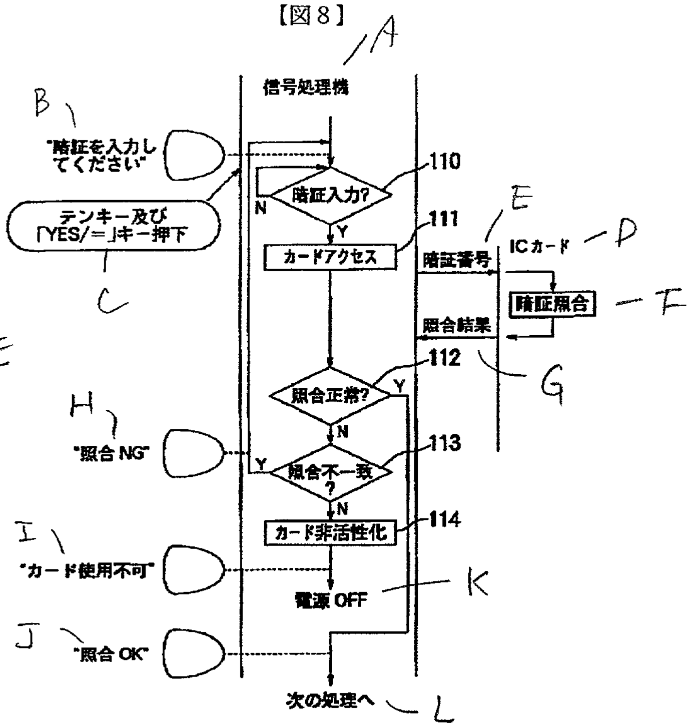
【図１４】



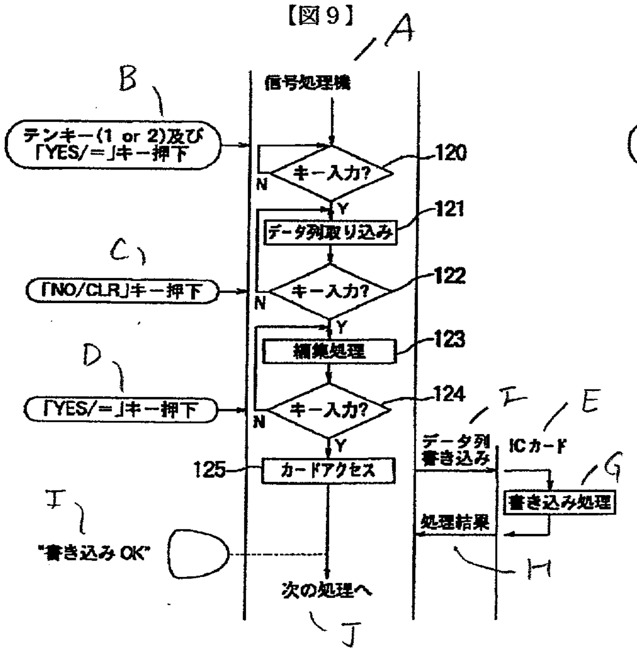
【図７】


A
信号処理機
B
「ON/OFF」キー押下
初期化
101
自己診断
102
C
"処理機異常"
N
正常?
103
Y
"カードを挿入してください"
カード挿入?
104
N
Y
F
ICカード
E
電気的活性化
初期応答データ
G
105
カード活性化
106
適合カード?
Y
N
107
カード非活性化
H
"不適合カード"
電源 OFF
I
次の処理へ
J

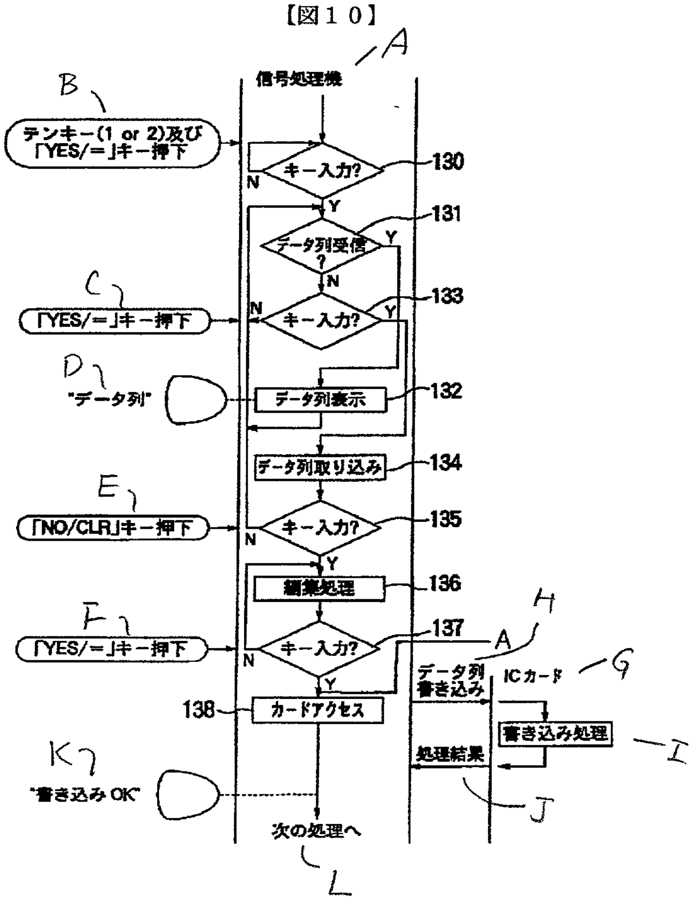
【図８】


A
信号処理機
B
"暗証を入力してください"
テンキー及び「YES/＝」キー押下
C
暗証入力?
N
110
Y
カードアクセス
111
E
暗証番号
ICカード
D
暗証照合
F
照合結果
G
照合正常?
112
Y
N
H
"照合 NG"
Y
照合不一致?
113
N
カード非活性化
114
I
"カード使用不可"
電源 OFF
K
J
"照合 OK"
次の処理へ
L

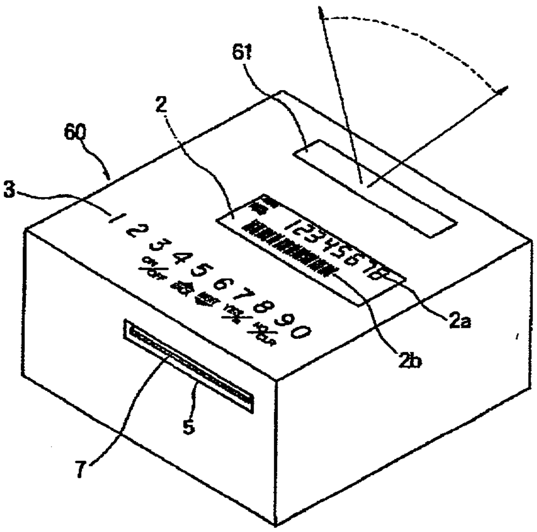
【図９】


A
信号処理機
B
テンキー(1 or 2)及び「YES/＝」キー押下
キー入力?
120
N
Y
データ列取り込み
121
C
「NO/CLR」キー押下
キー入力?
122
N
Y
編集処理
123
D
「YES/＝」キー押下
キー入力?
124
N
Y
F
E
データ列書き込み
ICカード
G
125
カードアクセス
書き込み処理
I
処理結果
H
"書き込み OK"
次の処理へ
J

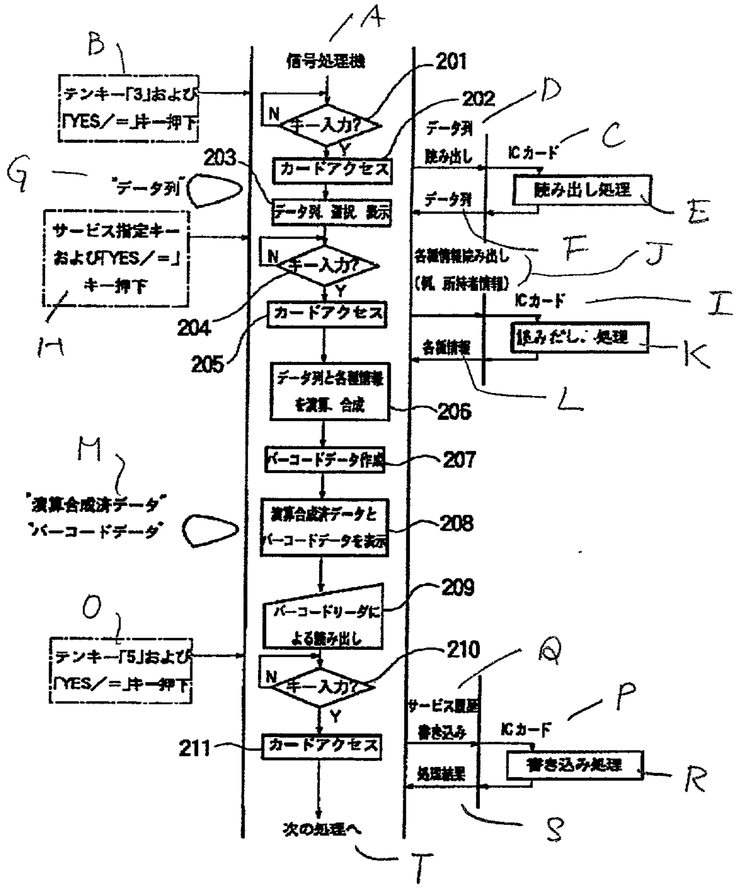
【図１０】


A
信号処理機
B
テンキー(1 or 2)及び「YES/＝」キー押下
キー入力?
130
N
Y
データ列受信?
131
Y
N
C
「YES/＝」キー押下
N
キー入力?
133
Y
D
"データ列"
データ列表示
132
データ列取り込み
134
E
「NO/CLR」キー押下
キー入力?
135
N
Y
編集処理
136
F
「YES/＝」キー押下
キー入力?
137
N
Y
A
H
データ列書き込み
ICカード
G
138
カードアクセス
書き込み処理
I
処理結果
J
K
"書き込み OK"
次の処理へ
L

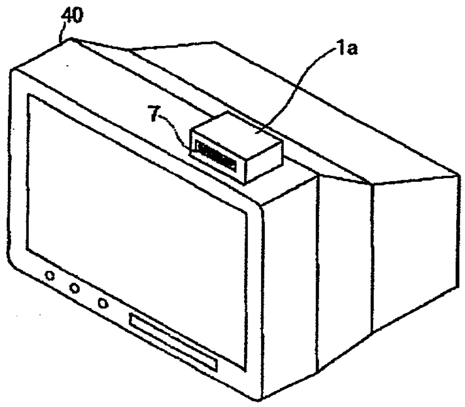
【図１３】


61
2
60
3
1 2 3 4 5 6 7 8 9 0
123456 78
2a
2b
5
7

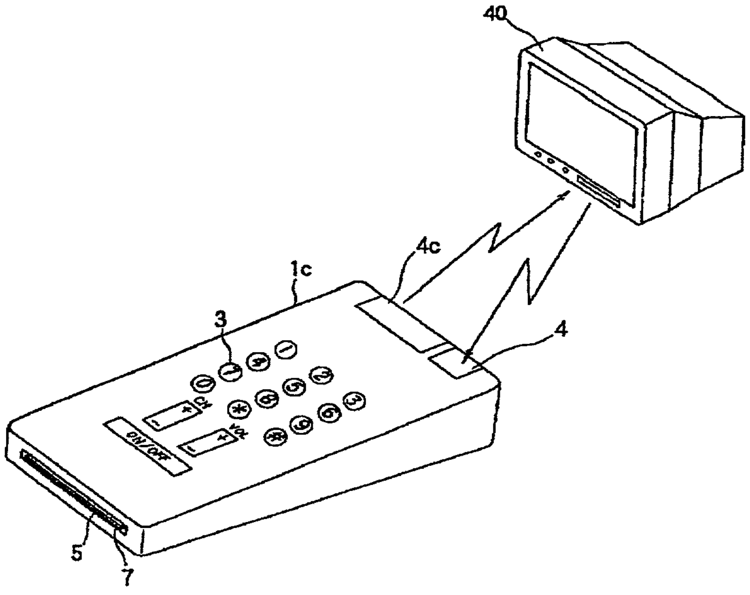
【図１５】


A
信号処理機
B
テンキー「3」および「YES／＝」キー押下
201
N
キー入力?
Y
202
D
データ列
読み出し
C
ICカード
203
カードアクセス
G
"データ列"
読み出し処理
E
データ列選択 表示
データ列
F
サービス指定キーおよび「YES／＝」キー押下
H
N
キー入力?
Y
各種情報読み出し
(例．所持者情報)
J
204
ICカード
I
205
カードアクセス
読みだし処理
K
各種情報
L
データ列と各種情報を演算、合成
206
M
バーコードデータ作成
207
"演算合成済データ"
"バーコードデータ"
演算合成済データとバーコードデータを表示
208
バーコードリーダによる読み出し
209
O
テンキー「5」および「YES／＝」キー押下
N
キー入力?
210
Q
Y
サービス履歴
書き込み
ICカード
P
211
カードアクセス
書き込み処理
R
処理結果
S
次の処理へ
T

【図１６】



【図１７】


40
4c
1c
3
4
ON/OFF
5
7

09/890910
JC03 Rec'd PCT/PTO 02 AUG 2001

Japanese Patent Application,
Laid-Open Publication No. H6-121075

[Title of the Invention] Prepaid system using portable terminal

[Abstract]

[Object] The invention relates to a mobile communication system, and its object is to provide a portable terminal with the same function as that of a prepaid card.

[Constitution] A prepaid center, a bank deposit system, and radio base stations each having a prepaid card control device are connected to a general telephone network. From a portable terminal, a user accesses the prepaid center or the bank deposit system in order to transfer money to the prepaid center and accesses a radio base station having the prepaid card control device in order to perform payment processing.

[Claims]

[Claim 1] A prepaid system using a portable terminal, in which a prepaid center connected to a bank deposit system and radio base stations having prepaid control devices are connected to a communication network to thereby constitute a mobile communication system including the radio base stations, the prepaid system comprising:

means for enabling a subscriber to access the prepaid center or the bank deposit system from the portable terminal and carry out a first communication, while using a certain authentication method, to transfer a certain amount of money from the bank account of the subscriber to the prepaid center and to store the amount of the transferred money in the portable terminal;

means for causing the portable terminal to carry out a second communication with the radio base station having the prepaid control device in the zone of the radio base station, while using an authentication method different from that used for the first communication, to perform payment processing, subtract the amount from the amount stored in the portable terminal, and store the balance; and

means for causing the prepaid control device to access the prepaid center at regular intervals in order to adjust the prepaid amount of each subscriber.

[Claim 2] A prepaid system using a portable terminal, in which a prepaid center connected to a bank deposit system and radio base stations having prepaid control devices are connected to a communication network to thereby constitute a mobile communication system including the radio base stations, the prepaid system comprising:

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means for enabling a subscriber to access the prepaid center or the bank deposit system from the portable terminal and carry out a first communication, while using a certain authentication method, to transfer a certain amount of money from the bank account of the subscriber to the prepaid center and to store the amount of the transferred money in the portable terminal;

means for causing the portable terminal to carry out a second communication with the radio base station having a prepaid control device in the zone of the radio base station, while using an authentication method different from that used for the first communication, to transmit and receive specific information and store the result in the portable terminal;

means for causing the portable terminal to carry out a third communication with another radio base station having a prepaid control device in the zone of the radio base station, while using an authentication method different from that used for the first communication, to perform payment processing, subtract the amount from the amount stored in the portable terminal, and store the balance; and

means for causing the prepaid control device to access the prepaid center at regular intervals in order to adjust the prepaid amount of each subscriber.

[Detailed Description of the Invention]

[0001]

[Industrial Applicability]

The present invention relates to a system for enabling purchase of a prepaid card and payment by the prepaid card to be performed by use of a portable terminal.

[0002]

[Prior Art]

In recent years, a scheme in which one purchases a card having a predetermined amount of money magnetically recorded thereon and makes payment by the card has been becoming popular as a method for making payment for a commodity, a ticket and the like. Examples of cards used in such a scheme include a card used for a public telephone (telephone card), a card used for purchasing a train ticket ("orange card" or "metro card") and a card used for paying for gasoline at the gas station.

[0003]

[Problems to be Solved by the Invention]

The above conventional prepaid cards are used as follows. A user goes to a store or vending machine selling those cards to purchase a card and uses it by inserting the card into a vending machine or the like. At this point, in the case of a public telephone, points (monetary value) corresponding to the length of a call and the destination of the call are subtracted from the card and updated, and the remaining points are displayed on the public telephone.

[0004]

To use such a conventional system, one must go to the place where the card is sold to purchase it in advance. Further, since different services require different cards, one must purchase and use different cards for different services. In addition, the card must be inserted into a card device every time it is used. It is therefore the object of the present invention to provide a system which does not require a user to go to a certain place to purchase the card and frees the user from the inconvenience of carrying different cards for different services.

[0005]

[Means for Solving the Problem]

According to the present invention, the above object is achieved by the means described in the above claims. That is, the invention of claim 1 is a prepaid system using a portable terminal, in which a prepaid center connected to a bank deposit system and radio base stations having prepaid control devices are connected to a communication network to thereby constitute a mobile communication system including the radio base stations, the prepaid system comprising: means for enabling a subscriber to access the prepaid center or the bank deposit system from the portable terminal and carry out a first communication, while using a certain authentication method, to transfer a certain amount of money from the bank account of the subscriber to the prepaid center and to store the amount of the transferred money in the portable terminal; means for causing the portable terminal to carry out a second communication with the radio base station having the prepaid control device in the zone of the radio base station, while using an authentication method different from that used for the first communication, to perform payment processing, subtract the amount from the amount stored in the portable terminal, and store the balance; and means for causing the prepaid control device to access the prepaid center at regular intervals in order to adjust the prepaid amount of each subscriber.

[0006]

Further, the invention of claim 2 is a prepaid system using a portable terminal, in which a prepaid center connected to a bank deposit system and radio base stations having prepaid control devices are connected to a communication network to thereby constitute a mobile communication system including the radio base stations, the prepaid system comprising: means for enabling a subscriber to access the prepaid center or the bank deposit system from the portable terminal and carry out a first communication, while using a certain authentication method, to transfer a certain amount of money from the bank account of the subscriber to the prepaid center and to store the amount of the transferred money in the portable terminal; means for causing the portable terminal to carry out a second communication with the radio base station having a prepaid control device in the zone of the radio base station, while using an authentication method different from that used for the first communication, to transmit and receive specific information and store the result in the portable terminal; means for causing the portable terminal to carry out a third communication with another radio base station having a prepaid control device in the zone of the radio base station, while using an authentication method different from that used for the first communication, to perform payment processing, subtract the amount from the amount stored in the portable terminal, and store the balance; and means for causing the prepaid control device to access the prepaid center at regular intervals in order to adjust the prepaid amount of each subscriber.

[0007]

□

[Action]

□

In the system of the present invention, a prepaid center, a bank deposit system and radio base stations having prepaid card control devices are connected to a general telephone network, and a portable terminal is used in the same manner as a prepaid card is used. That is, the portable terminal accesses the prepaid center or a bank through the general telephone network, transfers money from the bank to the prepaid center, and stores the amount of the transmitted money. Then, the portable terminal communicates, by means of radio, with the control devices for prepaid service and functions just like the prepaid card.

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[0008]

Thus, since a portable terminal is used as a substitute for a prepaid card in the present invention, a service subscriber can enjoy the service without having to carry the card or insert the card into a device designed specifically for the card. Further, even when the subscriber runs out of the prepaid amount, as in the case where he or she buys a new prepaid card, he or she can prepay money again by using the communication network to which the portable terminal subscribes. Hereinbelow, the action and the like of the present invention will be described in detail with reference to an embodiment.

[0009]

[Embodiment]

Fig. 1 is a diagram illustrating one embodiment of the present invention. In Fig. 1, reference numeral 100 denotes a home station which manages the data of portable terminals, 101 and 102 exchanges, 103 a prepaid center, 104 a bank database, 105 and 106 radio base stations for portable telephones, 107 and 108 prepaid control devices, 109 and 110 radio base stations connected to the control devices, 111 and 112 portable terminals, 113 and 114 radio zones of the radio base stations for portable telephones, and 115 and 116 radio zones of the radio base stations 109 and 110.

[0010]

The control devices 107 and 108 are connected to the exchanges 101 and 102 by wired lines. However, within the zones 115 and 116 of the radio base stations 105 and 106, the control devices 107 and 108 can be connected to the exchanges 101 and 102 via the radio base stations 105 and 106, respectively. Further, although the prepaid center and the bank database are directly connected to each other, they may be connected to each other via network or to exchanges.

[0011]

Table 1 shows an example of the contents of the stored data of the portable terminal 111. The portable terminal 111 has a memory section used for general communication and a memory section used for prepaid service. As for the contents of the memory section used for general communication, Table 1 shows only those which are used in the present invention.

[0012]

[Table 1]

Memory section for general communication	Memory section for prepaid service
Portable terminal number	Prepaid service subscriber number
Arithmetic expression for authentication	Key for accessing memory section for prepaid service
	Simplified arithmetic expression for authentication
	Prepaid center number
	Bank account number
	Control number
	Prepaid amount
	Station code

[0013]

Firstly, a description will be given of the operation of a first communication which enables a service subscriber to input prepayment into the terminal 111. When the service subscriber dials the number of the prepaid center 103 from the potable terminal 111 via the radio base station 105, the exchange 101 first accesses the home station 100. The home station 100 performs authentication processing in order to check whether the potable terminal 111 is an authorized terminal. The authentication may be performed by a variety of methods. For example, the home station 100 sends a random number to the potable terminal 111, and the potable terminal 111 performs a predetermined computation allocated to the portable terminal on the basis of the random number, and returns the result of the computation to the home station.

[0014]

The home station also performs the computation allocated to the portable terminal based on the sent random number and compares the result of the computation with the returned computation result and confirms that the results are the same to authenticate the terminal. The result of the authentication is also sent to the exchange 101, and when it is confirmed that the terminal is authentic, the exchange 101 accepts the call from the portable terminal 111 and extends the line to the prepaid center 103. At this point, the exchange 101 also sends out the number of the portable terminal 111 to the prepaid center.

[0015]

Following the guidance of the prepaid center 103, the service subscriber inputs a predetermined prepaid service subscriber number, the bank account number of the service subscriber, an amount of money he wishes to be prepaid and, as required, a password, into the portable terminal through dialing. It is desirable that the prepaid service subscriber number and the bank account number be preset in the portable terminal and sent out automatically by pressing a special button on the portable terminal or by using abbreviated dialing.

[0016]

The prepaid center checks the number of the portable terminal 111, prepaid service subscriber number, bank account number and password which have been sent from the exchange. When the prepaid center confirms that these numbers match with the corresponding numbers stored for each prepaid service subscriber number, it accesses the bank database 104 and withdraws the requested amount of money from the account of the service subscriber. When the withdrawal is completed, the prepaid center 103 notifies the portable terminal 111 that the prepayment was made successfully and writes the prepaid amount to the memory section for prepaid service.

[0017]

A different key (key for accessing the memory section for prepaid service shown in Table 1) corresponding to the portable terminal 111 is provided for the memory section for prepaid service. Therefore, when the prepaid center 103 writes data in the memory section for prepaid service of the portable terminal 111, the prepaid center 103 performs the writing operation by use of the key. This method is effective in preventing malicious data writing. This key is preset in the portable terminal and stored in the prepaid center when the user of the portable terminal subscribes to the prepaid service. When the deposit in the bank account is short of the amount of money to be prepaid, the prepaid center notifies the portable terminal 111 that prepayment cannot be made.

[0018]

Although, in the above description, the service subscriber starts with dialing the number of the prepaid center to receive the prepaid service, conceivably, sending out the bank account number and password of an individual service subscriber to the prepaid center is not preferred in some cases. In these cases, the following procedure may be performed. Firstly, the subscriber dials the number of the bank database 104 to connect the portable terminal to the database 104. Then, the bank account number, password and prepaid service subscriber number of the service subscriber and the prepaid amount are sent out to the bank database. When the bank database 104 confirms that the service subscriber is eligible for prepayment, the database 104 accesses the prepaid center and sends out the portable terminal number, prepaid service subscriber number and prepaid amount which have been sent from the exchange. Thereafter, the prepaid center or the bank database sends out a signal to notify the completion of withdrawal and rewrites the memory section for prepaid service of the portable terminal. Further, although the diagram shows that the prepaid center 103 and the bank database 104 are directly connected to each other, it is also conceivable that they may be connected to each other via a packet communication network.

[0019]

Next, a description will be given to the second communication of the portable terminal 111 after prepayment. The radio base station 109 in Fig. 1 is installed at the entrance of a pay building such as a movie theater. The radio channel transmitted from the radio base station 109 is a special channel for the prepaid service. The portable terminal 111 scans both the channel for general communication and the channel for the prepaid service.

[0020]

When the portable terminal 111 receives a signal from the channel transmitted by the radio base station 109, it sends out a prepaid request signal. This signal is sent to the control device 107 via the radio base station 109. This signal includes the information about the portable terminal number, the prepaid service subscriber number and the amount of the current prepayment.

[0021]

The control device 107 authenticates the subscriber based on the portable terminal number and the prepaid service subscriber number. This authentication system is different from the one performed by the base station 100 on the general communication network and is determined independently in the prepayment system. The authentication system is preferably simple. For example, in the case of a system in which authentication is performed by using a random number and an arithmetic expression as in the case of the aforementioned authentication on the general communication network, the system can be simplified by using an arithmetic expression which is simple and can be calculated quickly or by sharing the same arithmetic expression for a group of service subscribers, for example, an arithmetic expression 1 for prepaid service subscriber numbers 1 to 1,000, an arithmetic expression 2 for prepaid service subscriber numbers 1,001 to 2,000, and so on, instead of changing arithmetic expressions from one prepaid service subscriber number to another. When the authentication is performed successfully, the control device 107 confirms that the amount of entrance fee is not larger than the prepaid amount notified by the portable terminal and sends the amount of the entrance fee to the portable terminal 111. The portable terminal 111 subtracts the amount of the entrance fee from the prepaid amount stored in the memory section for prepaid service.

[0022]

Further, the control device 107 opens the entrance of the building to allow the prepaid service subscriber to enter the building. If the prepaid amount is smaller than the amount of the entrance fee, the control device 107 notifies the portable terminal 111 that the prepayment is short of the entrance fee. The portable terminal 111 notifies the prepaid service subscriber of the lack of the prepayment by beeping or displaying a message or the like. The prepaid service subscriber performs the aforementioned prepayment procedure on the prepaid center 103 via the radio base station 105 to increase the prepaid amount and then accesses the control device 107 again. The control flow of the portable terminal is shown in Fig. 2.

[0023]

Next, a description will be given to the case where the portable terminal 111 makes payment by the prepayment system over a plurality of radio base stations and control devices. This corresponds to the case where one gets on a train, for example. That is, the radio zone 115 in Fig. 1 is located at the entrance gate of the station where one gets on a train, and the radio zone 116 is located at the entrance gate of the station where he gets off the train. When the service subscriber enters the radio zone 115 with the portable terminal 111 and the portable terminal 111 receives a signal from the channel transmitted by the radio base station 109, it sends out a prepaid request signal. This signal is sent to the control device 107 via the radio base station 109.

[0024]

This signal includes the portable terminal number, the prepaid service subscriber number and the amount of the current prepayment. The control device 107 authenticates the subscriber based on the portable terminal number and the prepaid service subscriber number. When the authentication is performed successfully and it is confirmed that the prepaid amount is higher than or equal to a given amount of money, the control device 107 sends the code of the station where the radio zone 115 is located to the portable terminal 111 to cause the terminal 111 to store it and opens the entrance gate.

[0025]

When the service subscriber gets off at the destination station and enters the radio zone 116, the portable terminal 111 receives a radio channel transmitted by the radio base station 110. Through this channel, signals indicating that they are for a destination station are transmitted. The portable terminal 111 sends a prepaid request signal to the prepaid control device 108. This signal includes the code of the station where the radio station 115 is located as well as the portable terminal number, the prepaid service subscriber number and the amount of the current prepayment which have been sent out at the time of getting on the train. After authenticating the potable terminal 111, the prepaid control device 108 calculates a fee for the ride from the code of the station where the radio zone 115 is located and the code of the station where the radio zone 116 is located. When the amount of the fee is smaller than the prepaid amount, the amount of the fee is sent to the portable terminal 111 which then subtracts it from the prepaid amount stored in the memory section for prepaid service. Meanwhile, the control device 107 opens the entrance gate of the station to allow the prepaid service subscriber to pass through the gate.

[0026]

Next, a description will be given to the control of the transmission of the payments made by the service subscriber to the prepaid center by the control devices 106 and 107. The control devices 106 and 107 stores portable terminal numbers, prepaid service subscriber numbers, amounts of payments, balances of prepayments, dates and times of control, control device numbers and, in the case of station, the codes of departure and destination stations and the like, and make access to the prepaid center at proper intervals, for example, once per hour, to pass these data to the prepaid center.

[0027]

The prepaid center accesses the service subscriber database, subtracts the amount of payments from the stored prepayment balance, and stores the new balance. At this point, it is checked whether the portable terminal number is authentic and the transmitted prepayment balance matches with the calculated prepayment balance. If they don't match with each other, there is a possibility that an unauthorized terminal exists. In other words, if the transmitted portable terminal number is different from the one stored in the database, this indicates that the portable terminal is an unauthorized terminal, and if the prepayment balance calculated at the prepaid center is smaller than the transmitted prepayment balance, this indicates that an unauthorized terminal exists and has been used illegally.

[0028]

When there is a possibility that the portable terminal is an unauthorized portable terminal, the prepaid centers transmits the portable terminal number and the subscriber number of the portable terminal to all the control devices, thereby preventing the further use of the portable terminal or uncovering the unauthorized portable terminal. Further, the prepaid center stores various types of information transmitted from the control devices for a predetermined period. This enables various services such as provision of the list of various types of information to service subscribers. Further, each time a service subscriber accesses the control devices to make payment, a control number is imparted to the access, which control number is then stored in the portable terminal and at the prepaid center and is checked each time the control devices transmit a use fee. This can detects the presence of an unauthorized portable terminal and prevent illegal use thereof.

[0029]

Although the above description is made with reference to an example in which a control device is installed at the entrance of a movie theater and a station, the system of the present invention is not limited to these applications. The present invention can be applied to shopping in an ordinary store. In this case, a salesclerk inputs an amount of payment into a terminal connected to the control device, which then sends the amount of payment to the portable terminal of a client in accordance with the same procedure as used in the case of the movie theater. Further, although the management and authentication of portable terminals are performed based on portable terminal numbers in the above description, when a number is allocated to an individual as in the case of personal communication in which a telephone number is given to an individual, it is desirable that the management and authentication of portable terminals be performed based on these personal numbers. In particular, since a scheme for strictly authenticating a subscriber has been invented in the field of personal communication, the personal communication can be used effectively in the prepaid system.

[0030]

[Effects of the Invention]

As described above, according to the present invention, the following advantages are provided.

(1) Since the prepaid amount is stored in a radio portable terminal which is considered to be owned by each individual in the future and which is used in an ordinary telephone, there is no need to carry other prepaid cards and all payments can be made by the terminal.

(2) Since the radio portable terminal accesses the control device and makes payment by radio, it does not need to be inserted into a prepaid device and exhibits good service availability.

(3) Since the prepaid center and the bank database are connected to a general communication network, the radio portable terminal can make access to them easily and perform the prepayment procedure.

[0031]

(4) Since strict authentication of a terminal is performed in a radio portable terminal, especially in personal communication service which is considered to be provided in the future, by using the authentication on the general communication network at the time of prepayment, the authentication performed at the prepaid side can be simple and performed quickly.

(5) When the prepaid amount is short of the amount of payment to be made, prepayment can be performed again on the spot via the general communication network.

[Brief Description of the Drawing]

[Fig. 1] A diagram illustrating one embodiment of the present invention.

[Fig. 2] A flowchart illustrating an example of the control of the portable terminal for prepaid service.

[Descriptions of Reference Numerals]

100	home station
101, 102	exchanges
103	prepaid center
104	bank database
105, 106	radio base stations
107, 108	prepaid control devices
109, 110	radio base station connected to the prepaid control devices

111, 112	portable terminal
113, 114	radio zones of the radio base stations 105 and 106
115, 116	radio zones of the radio base stations 109 and 110

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Fig. 1

DIAGRAM ILLUSTRATING ONE EMBODIMENT OF THE PRESENT INVENTION.

Fig. 2

FLOWCHART ILLUSTRATING AN EXAMPLE OF CONTROL OF PORTABLE TERMINAL FOR PREPAID SERVICE

A: START

B: RECEIVED CHANNEL FROM CONTROL RADIO BASE STATION ?

NO, YES

C: TRANSMIT PREPAID REQUEST SIGNAL

D: RECEIVED RANDOM NUMBER FOR AUTHENTICATION ?

NO, YES

E: TRANSMIT RESULT OF AUTHENTICATION COMPUTATION

F: RECEIVE PAYMENT AMOUNT

G: SUBTRACT PAYMENT AMOUNT FROM MEMORY SECTION FOR PREPAID SERVICE

H: BALANCE IS INSUFFICIENT

I: NOTIFY THAT BALANCE IS INSUFFICIENT

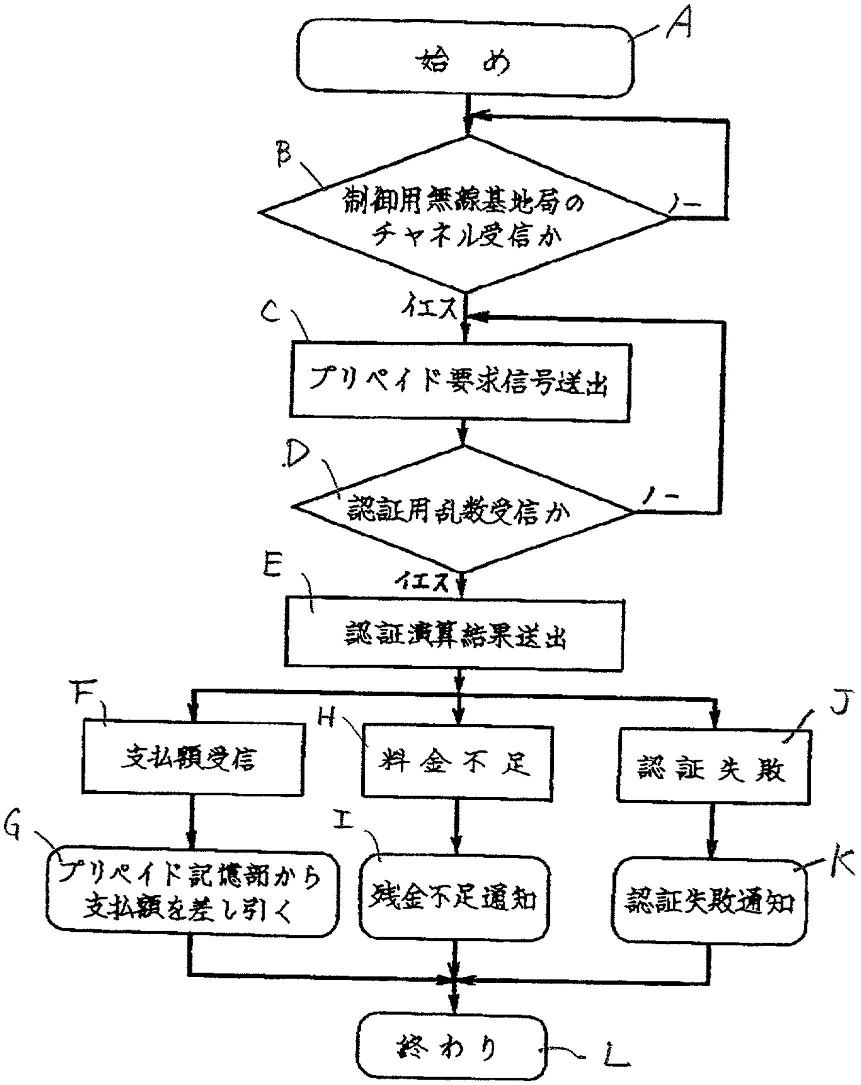
J: AUTHENTICATION FAILED

K: NOTIFY THAT AUTHENTICATION HAS FAILED

L: END

【図2】

プリペイド用携帯端末の制御の例を示す流れ図


A
始め
B
制御用無線基地局のチャネル受信か
ノー
イエス
C
プリペイド要求信号送出
D
認証用乱数受信か
ノー
イエス
E
認証演算結果送出
F
支払額受信
H
料金不足
J
認証失敗
G
プリペイド記憶部から支払額を差し引く
I
残金不足通知
K
認証失敗通知
終わり
L

Inventor(s): Takeshi NATSUNO

Title: Mobile Communication Terminal and Card Information Reading Device

POWER OF ATTORNEY

The specification of the above-identified patent application:

☐ is attached hereto

☒ was filed on December 7, 2000 as International Application No. PCT/JP00/08654

I hereby revoke all previously granted powers of attorney in the above-identified patent application and appoint the following attorneys to prosecute said patent application and to transact all business in the Patent and Trademark Office connected therewith:

Gustavo Siller, Jr. - 32,305 ②
Tadashi D. Horie - 40,437

Please address all correspondence and telephone calls to Tadashi Horie in care of:

Brinks Hofer Gilson & Lione
P.O. Box 10395
Chicago, IL 60610
(312)321-4200

The undersigned hereby authorizes the U.S. attorneys named herein to accept and follow instructions from _______ as to any action to be taken in the Patent and Trademark Office regarding this application without direct communication between the U.S. attorney and the undersigned. In the event of a change in the persons from whom instructions may be taken, the U.S. attorneys named herein will be so notified by the undersigned.

NTT DoCoMo, Inc., a Japanese Corporation, certifies that it is the assignee of the entire right, title and interest in the patent application identified above by virtue of either:

☒ An assignment from the inventor(s) of the patent application identified above, a copy of which is attached hereto.

OR

☐ An assignment from the inventor(s) of the patent application identified above. The assignment was recorded in the Patent and Trademark Office at Reel _____, frame ______.

OR

☐ A chain of title from the inventor(s), of the patent application identified above, to the current assignee as shown below:

1. From _____ To:
   The document was recorded in the Patent and Trademark Office at
   Reel _____, frame _____, or a copy thereof is attached.
2. From _____ To:
   The document was recorded in the Patent and Trademark Office at
   Reel _____, frame _____, or a copy thereof is attached.

☐ Additional documents in the chain of title are listed on a supplemental sheet.

The undersigned has reviewed the assignment or all the documents in the chain of title of the patent application identified above and, to the best of undersigned's knowledge and belief, title is in the assignee identified above.

The undersigned (whose title is supplied below) is empowered to act on behalf of the assignee.

I hereby declare that all statements made herein of my own knowledge are true, and that all statements made on information and belief are believed to be true; and further, that these statements are made with the knowledge that willful false statements, and the like so made, are punishable by fine or imprisonment, or both, under Section 1001, Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Signature: Yoshitaro Shimanuki   Date: May 24, 2001

Name: Yoshitaro SHIMANUKI

Title: Executive Manager
Intellectual Property Department

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DECLARATION FOR PATENT APPLICATION

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled Mobile Communication Terminal and Card Information Reading Device

☐ is attached hereto.

☒ was filed on December 7, 2000 as International Application No. PCT/JP00/08654.

☐ and was amended on _____ (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the patentability as defined in Title 37, Code of Federal Regulations, § 1.56(a).

I hereby claim foreign priority benefits under 35 U.S.C. § 119(a)-(d) or § 365(b) of any foreign application(s) for patent or inventor's certificate or § 365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or PCT International application having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s)			Priority Claimed	
Hei 11-352265	Japan	10/12/1999	☒	☐
Hei 11-352267	Japan	10/12/1999	☒	☐
(Number)	(Country)	(Day/Month/Year Filed)	Yes	No

I hereby claim the benefit under 35 U.S.C. § 119(e) of any United States provisional application(s) listed below:

(Application Serial No.)	(Filing Date)

I hereby claim the benefit under 35 U.S.C. § 120 of any United States application(s), or § 365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of 35 U.S.C. § 112, I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR § 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of this application:

PCT/JP00/08654	December 7, 2000	Pending
(Application Serial No.)	(Filing Date)	(Status-patented, pending, abandoned)

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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Inventor's Signature _______________ Date: May 22, 2001
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